July 1999

QUARTERLY SAMPLING REPORT AND ANNUAL GROUNDWATER MONITORING PHIBRO-TECH, INC.

Santa Fe Springs, California

October 20, 1999

Prepared for:

Phibro-Tech, Inc.
8851 Dice Road
Santa Fe Springs, California 90670

Prepared by:

Camp Dresser & McKee Inc.
18881 Von Karman, Suite 650
Irvine, California 92612

CDM Project No. 2279-11463-111.REP.REPT

PHIBRO-TECH, INC.

October 21, 1999

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Los Angeles, CA 90013

Mr. Ron Leach
USEPA, Region IX (H-4-4)
75 Hawthorne Avenue
San Francisco, CA 94105

Mr. Jose Kou
California Environmental Protection Agency
DTSC Region 3
1011 N. Grandview Avenue
Glendale, CA 91201

Dear Ms. Chou and Messrs. Leach and Kou:

Enclosed is the Third Quarter 1999 Quarterly Groundwater Monitoring Report for Phibro-Tech, Inc., Santa Fe Springs facility. The Report includes analytical results and physical measurements obtained July 19-21, 1999 from selected monitoring wells at Phibro-Tech. Since this Report includes portions of the RCRA Facility Investigation (USEPA Docket No. RCRA 09-89-0001), this Report is also submitted to EPA.

Based on a technical review by our consultant, Camp Dresser and McKee, a groundwater monitoring program is included which was implemented beginning with the April 1991 groundwater monitoring. Additional wells and parameters changed at the request of EPA are included in this Groundwater Monitoring Report. The changes are described in the Report. Please contact me if you have any questions or comments concerning this Report.

Very truly yours,

E E Vigil

E. E. Vigil
Environmental and Safety Manager

EEV/kn/qtrgrdwtrrpt
Enclosure

cc: see following page

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CDM CAMP DRESSER & McKEE INC.
environmental engineers, scientists, planners & management consultants

TRANSMITTAL SHEET

18881 Von Karman, Suite 650
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Date October 20, 1999

Job 2279-11463-111.REP.REPT

To Phibro-Tech, Inc.
8851 Dice Road
Santa Fe Springs, CA 90670

Attn: Ed Vigil

We are sending	herewith ..... X under separate cover ..... by messenger .....

Seven print(s) each of the following:

July 1999 Quarterly Sampling Report, dated October 20, 1999

(one 3-ring-bound and six comb-bound copies).

which are:	approved ..... approved as noted ..... returned to your for correction and resubmittal ..... for your records X

by: Leslie A Dybel
for Sharon Wallin, R.G.

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Section 1
Introduction

This report summarizes the 53nd RCRA quarterly groundwater monitoring sampling and analyses period at the Phibro-Tech, Inc. (PTI), Santa Fe Springs, California facility (formerly referred to as Southern California Chemical). Contained herein are the results of laboratory analyses of groundwater samples and water level measurements obtained during the period of July 20 to July 22, 1999.

The purpose of the groundwater sampling program, which began in March 1985, is to determine if hazardous waste constituents are migrating from the facility to the groundwater beneath the site. This is accomplished through the comparison of background or up gradient water quality and groundwater quality beneath the site. Statistically-significant increases in contaminant concentrations between known areas of groundwater contamination and downgradient wells would indicate that migration is occurring. In the past, statistical analysis was performed annually and was included in the July quarterly monitoring reports. Statistical analysis is now conducted each quarter and is included in the corresponding monitoring report. The July 1999 statistical analysis is contained in Appendix E of this report.

To date, three types of contaminants have generally been detected in the groundwater beneath the site: soluble metals (primarily chromium and cadmium), purgeable aromatic organic compounds (toluene, ethylbenzene and total xylenes) and purgeable halogenated organic compounds (i.e., solvents, primarily trichloroethene [TCE]). Groundwater modeling completed in January 1993, and groundwater monitoring conducted since 1985, indicate that the purgeable aromatic plume originated up gradient from the PTI facility. The distribution of TCE appears to be ubiquitous, however, somewhat elevated concentrations exist in the vicinity of Pond 1, a RCRA-regulated former surface impoundment area. Elevated concentrations of soluble metals have also been consistently detected in the vicinity of Pond 1. Soluble metal concentrations at the down gradient property line and in deeper wells, however, continue to be negligible to non-detect.

Approximately 15 years of quarterly groundwater monitoring at the PTI facility has indicated a general lack of hexavalent chromium migration. During groundwater modeling performed by CDM in 1993, a retardation factor of 50 was selected based on the observed distribution of hexavalent chromium in the groundwater. Previous data analysis indicated that the most likely basis for the relatively high (but within the range of reasonable and appropriate values) retardation factor would be the existence of reducing conditions in the saturated zone, promoting the conversion of hexavalent chromium to trivalent chromium (Cr^{3+}). Trivalent chromium, having a very low solubility in water, would tend to precipitate and sorb to the soil, limiting migration. During four quarterly sampling events conducted in 1996, additional laboratory analyses (iron and redox potential) were performed on groundwater samples collected from wells MW-04, MW-09, and MW-14S. These additional data, along with the pH, total chromium, and hexavalent chromium data, provided a better understanding of the mechanisms controlling chromium migration in groundwater underlying the facility and supported the above hypothesis. Please refer to Section 6.4 (Chromium Fate and Transport) of the October 1996 Quarterly Sampling Report for a detailed discussion of this conclusion.

In addition to the data obtained during the July 1999 sampling, this report contains tables listing detection limits of the parameters analyzed (Appendix A). Copies of the original laboratory results are included in Appendix B. Chain-of-custody records for the July 1999 sampling are included in Appendix C. Appendix D contains background groundwater concentrations of contaminants for the Santa Fe Springs area for the year 1996. Appendix E contains the complete quarterly statistical analysis.

Prior to October 1993, quarterly reports have included analytical result summary tables from all previous sampling rounds. Starting with the October 1993 quarterly report, historical water quality data tables are no longer included in the report as an appendix. Please refer to Appendix B in the July 1993 Quarterly Sampling Report for a summary of historical groundwater analytical data. A summary table of key historical results since January 1989 is provided in Section 6 (Table 6-1) of this report.

Section 2
Monitoring Well Sampling

Groundwater sampling, utilizing existing on-site monitoring wells, was conducted by CDM personnel during the period of July 20 to July 22, 1999. Field activities were performed in general accordance with the groundwater sampling protocol as outlined in Section 4.3.3 of the approved RCRA Facility Investigation (RFI) Work Plan (CDM, June 1990). Prior to the submittal of the RFI Work Plan for regulatory agency review and approval, the J.H. Kleinfelder and Associates (Kleinfelder) Quality Assurance Project Plan (QAPP, May 1988) was used as the primary groundwater sampling guidance document. Proposed deviations from the RFI Work Plan (i.e., well purging using a submersible pump and sample collection using disposable bailers) were discussed in October 1994 correspondence to the DTSC. These changes were implemented during the October 1994 and all subsequent sampling events.

Twenty-four monitoring wells exist on-site. The locations of these wells are shown on Figure 2-1. One well, MW-06A, historically has not been sampled for groundwater analysis because it is screened in the Gage Aquifer, which is unsaturated below the PTI facility. The remaining wells are screened in the Hollydale Aquifer; 16 in the upper portion and seven in the lower portion of the aquifer.

Beginning in February 1985, Kleinfelder initiated groundwater sampling, utilizing monitoring wells MW-01 through MW-06B. Six additional wells (MW-04A and MW-07 through MW-11) were installed at the site in July 1985, thereby increasing the total number of active wells to 12. Quarterly sampling of the 12 wells was initiated in March 1986.

Commencing with the January 1989 sampling event, CDM has been responsible for all groundwater monitoring activities at the facility. Ten wells (MW-01D, MW-06D, MW-12S, MW-12D, MW-13S, MW-13D, MW-14S, MW-14D, MW-15S and MW-15D) were constructed as part of the first phase of the RFI program and were first sampled during the October 1990 sampling round.

Groundwater analysis of the 22 wells which existed during the RFI program from October 1990 to January 1991, indicated that the number of wells sampled could be reduced and yield comparable results to sampling all the wells. During the April, July, and October 1991, and January 1992 sampling rounds, the 11 wells sampled included 8 wells (MW-01S, MW-03, MW-04, MW-07, MW-09, MW-11, MW-14S, and MW-15S) screened in the upper portion of the Hollydale Aquifer and three wells (MW-01D, MW-04A, and MW-15D) screened in the lower portion of the Hollydale Aquifer.

Beginning with the April 1992 sampling round, three additional wells (MW-06B, MW-06D, and MW-16) were included in the quarterly monitoring program, bringing the total number of sampled wells to 14. A new well, MW-16, constructed in March 1992 as part of the Phase II RFI program, was sampled for the first time during the April 1992 sampling round. The same 14 wells have been sampled during all subsequent sampling rounds. On several occasions, additional laboratory analyses have been performed and additional wells included in quarterly sampling, at the request of the U.S. EPA. Additional analyses and wells are noted in the comments column of Table 2-1, which summarizes the groundwater monitoring program at the site.

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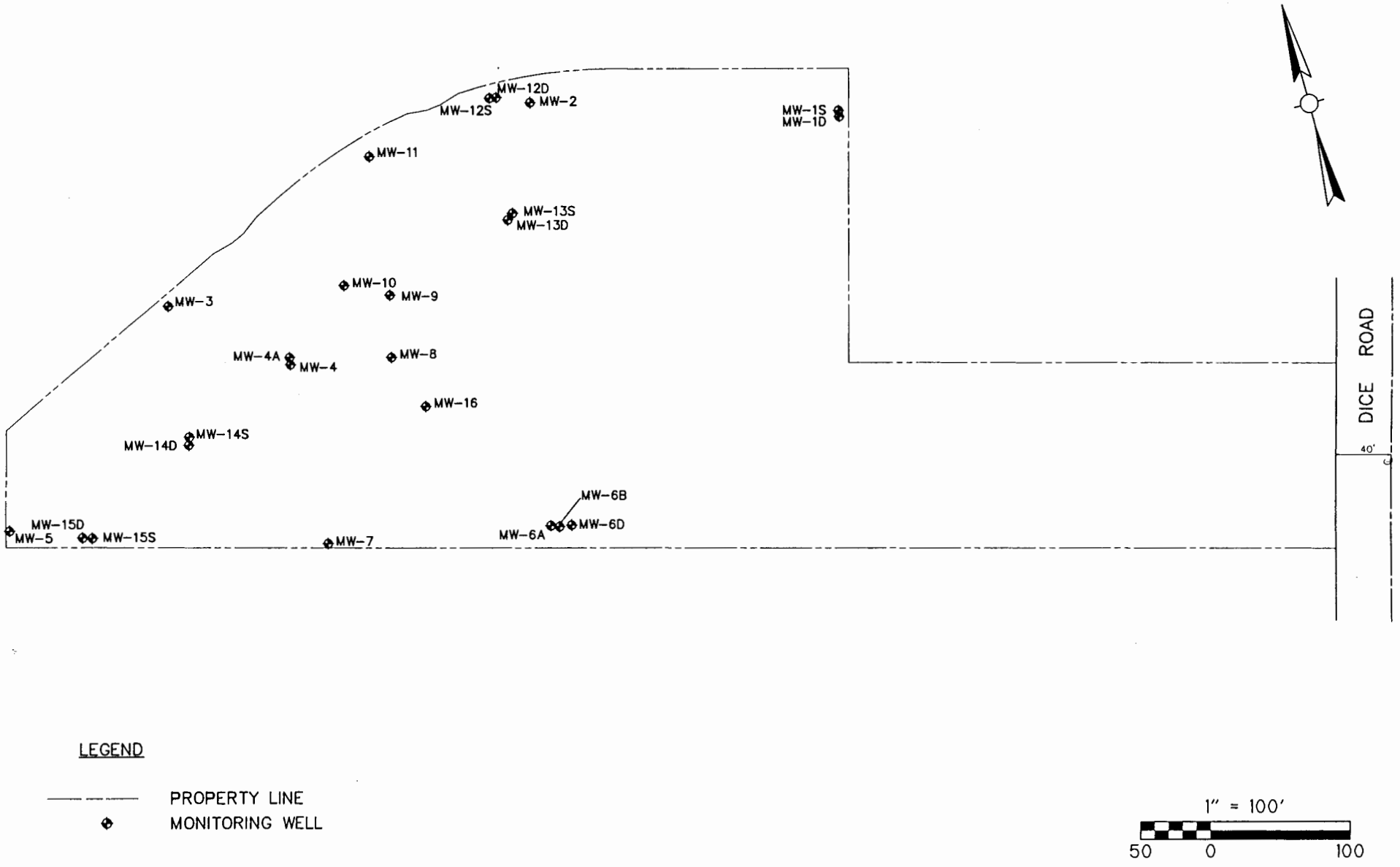

PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

Monitoring Well Location Map

CDM
environmental engineers, scientists, planners, & management consultants

Figure 2-1

TABLE 2-1
PHIBRO-TECH, INC.
Groundwater Monitoring Program Summary

Sampling Event	Indicator Parameters	Trace Metals	Hexavalent Chromium	Chloride	Nitrate	Volatile Organics	Appendix IX	Comments
3/85	Quad	Cu & Zn	X	X	X	--	--	Sampled wells MW-1, 2, 3, 4, 5, & 6B. Sulfide, nickel, copper and zinc requested by DOHS and RWQCB. Also Appendix III parameters and water quality parameters (see footnote).
7/85	Quad	Cd, Cr	X	--	X	--	--	Sampled wells MW-4A, 7, 8, 10 and 11
3/86	Quad	Cu & Zn	X	X	X	--	--	Sampled 12 wells (MW1, 2, 3, 4, 4A, 5, 6B, 7, 8, 9, 10 & 11). Also Appendix III parameters and water quality parameters (see footnote).
7/86, 9/86, 12/86	Quad	Cd, Cr, Cu, Zn	X	X	X	624	--	Sampled all 12 wells (as previous)
3/87	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	Sampled 11 wells, not 4A
7/87, 10/87, 2/88	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	After July 1987, all 12 wells were sampled during each event
6/88	X (not Quad)	Cd, Cr, Cu, Zn	X	X	X	601/602	--	Performed statistical analysis (t-test) on Indicator Parameters (IPs).
9/88	--	Cd, Cr, Cu, Zn	X	X	X	601/602	--	IPs & volatile organics from MW1, 2, 4A, 5, 6, 7 analyzed semi-annually in June/Dec.
1/89	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	After Jan. 1989, volatile organics analyzed for all 12 wells.
4/89	--	Cd, Cr, Cu, Zn	X	X	X	601/602	--	
7/89	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	Performed statistical analysis of Jan. thru July 1989 data (IPs, total and hexavalent chromium).
10/89	--	Cd, Cr, Cu, Zn	X	X	X	601/602	--	

TABLE 2-1
PHIBRO-TECH, INC.
Groundwater Monitoring Program Summary
(continued)

Sampling Event	Indicator Parameters	Trace Metals	Hexavalent Chromium	Chloride	Nitrate	Volatile Organics	Appendix IX	Comments
1/90	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	
4/90	--	Cd, Cr, Cu, Zn	X	X	X	601/602	--	
7/90	Quad	Cd, Cr, Cu, Zn	X	X	X	601/602	--	Performed statistical analysis of Jan. 1989 data (IPs, total and hexavalent chromium).
10/90	--	Cd, Cr, Cu, Fe, Ni, Pb, Zn	X	X	X	601/602	X	Sampled 22 wells, Appendix IX parameters analyses were performed on wells 4, 4A, 6B, 6D, 12S, 12D, 15S, 15D, plus a duplicate of 4.
1/91	Quad	Cd, Cr, Cu, Fe, Ni, Pb, Zn	X	X	X	601/602	--	Sampled 22 wells.
4/91	pH	Cd, Cr, Cu	X	--	--	601/602	--	New sampling program was initiated. Sampled 11 wells including wells MW-01S, MW-01D, -03, -04, -04A, -07, -09, -11, -14S, -15S, -15D.
7/91	pH	Cd, Cr, Cu	X	--	--	601/602	--	Performed annual statistical analysis.
10/91	pH	Cd, Cr, Cu	X	--	--	601/602	--	
1/92	pH only (all) TOC only (MW-01 & -04)	Cd, Cr, Cu	X	--	Ammonia as nitrogen (MW-01 & -04)	601/602	--	Ammonia & TOC analyses added at MW-01S and MW-04.
4/92	pH only TOC only (MW-01 , -04, -09, -14S)	Cd, Cr, Cu-all see coments	X	--	Ammonia as nitrogen (MW-01, -04, -09, -14S)	601/602	EDB (MW-04) TPH (W-16)	Sampled 14 wells including Wells MW-01S, -01D, -03, -04, -04A, -06B, -06D, -07, -09, -11, -14S, -15S, -15D, -16. Additional analysis as part of Phase II RFI; unfiltered metals on MW-04S and -14S. Pb and Ni on wells 1, 4, 14S, 15S, 16; Fe, Zn on well 16.
7/92	pH	Cd, Cr, Cu	X	--	--	601/602	--	Sampled 14 wells. Performed annual statistical analysis.

TABLE 2-1
PHIBRO-TECH, INC.
Groundwater Monitoring Program Summary
(continued)

Sampling Event	Indicator Parameters	Trace Metals	Hexavalent Chromium	Chloride	Nitrate	Volatile Organics	Appendix IX	Comments
10/92	pH	Cd, Cr, Cu	X	--	--	601/602	--	Sampled 14 wells.
1/93, 4/93	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells.
7/93	pH	Cd, Cr, Cu	X	--	--	8010/8020 (TVPH, TEPH)	--	Sampled 15 wells. (MW-13S was added) TVPH and TEPH analysis on MW-09, 13S, and 16 only. Performed annual statistical analysis.
10/93	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 15 wells (MW-13S not analyzed for metals and pH) TVPH & TEPH analysis on MW-04, 07, 09, 13S, and 16 only. Performed statistical analysis.
1/94, 4/94	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis.
7/94	pH	Cd, Cr, Cu	X	See comment	--	8010/8020	--	Sampled 14 wells, chloride and sulfate analyses on MW-04, MW-09, MW-14S, MW-15S, MW-15D, and MW-16. Performed statistical analysis
10/94, 1/95, 4/95, 7/95, 10/95	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis.
1/96	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis. 1995 Annual Report included as Appendix F.

TABLE 2-1
PHIBRO-TECH, INC.
Groundwater Monitoring Program Summary
(continued)

Sampling Event	Indicator Parameters	Trace Metals	Hexavalent Chromium	Chloride	Nitrate	Volatile Organics	Appendix IX	Comments
4/96, 7/96	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis.
10/96	pH	Cd, Cr, Cu	X	--	--	8010/8020	--	Sampled 14 wells Performed statistical analysis. 1996 Annual Report included as Appendix F.
1/97	pH	Cd, Cr, Cu	X	--	--	8260, MTBE	--	Sampled 14 wells Performed statiscal analysis.
4/97	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis.
7/97	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis.
10/97	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis. 1997 Annual Report included as Appendix F.
1/98	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis. Hexavalent Chromium by Method 7196 in all wells; and by Method 218.6 in wells MW-4A, MW-14S, MW-15S, and MW-15D.
4/98, 7/98	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis.

TABLE 2-1
PHIBRO-TECH, INC.
Groundwater Monitoring Program Summary
(continued)

10/98	pH	Cd, Cr, Cu	X	--	--	8260	--	Sampled 14 wells Performed statistical analysis. 1998 Annual Report included as Appendix F.
1/99, 4/99, 7/99	pH	Cd,Cr,Cu	X	--	--	8260	_	Sampled 14 wells Performed statistical analysis.

Appendix III Parameters - As, Ba, Cd, Cr, F, Pb, Hg, N, Se, Ag, Endrin, Lindane, Methoxychlor, Toxaphene, 2,4-D, 2,4,5-TP (Silvex), Radium, Gross Alpha & Beta, Turbidity, coliform bacteria.
Water Quality Parameters - Cl, Fe, Mn, Phenols, Na, SO4
Indicator Parameters (IP) - TOX, TOC, pH, EC (quadruplicate)
624 - Volatile organics analysis
601/602 - Purgeable halocarbons/aromatics analysis
8010/8020 - Purgeable halocarbons/aromatic analysis
8260 - Purgeable halocarbons/aromatic analysis
MTBE - Methyl tertiary butyl ether
Appendix IX Parameters - See Appendix F in the October 1990 Quarterly Sampling Report for a complete listing of parameters.

The 14 wells currently included in quarterly sampling are MW-01S, MW-01D, MW-03, MW-04, MW-04A, MW-06B, MW-06D, MW-07, MW-09, MW-11, MW-14S, MW-15S, MW-15D, and MW-16. Ten shallow and four deep wells are analyzed for pH, metals (cadmium, chromium, and copper using EPA Method 6010A; and hexavalent chromium using EPA Method 7196), and purgeable halogenated/aromatic organic compounds (EPA Method 8260). A detailed listing of analytical parameters per sampling event is provided in Table 2-1.

Beginning with the July 1993 sampling event, the 14 wells have generally been purged and sampled in the following order: MW-01, MW-01D, MW-03, MW-11, MW-06B, MW-06D, MW-07, MW-04A, MW-04, MW-14S, MW-15S, MW-15D, MW-16, and MW-09.

2.1 Sampling Procedure

Field sampling was conducted in general accordance with procedures detailed in the RFI Work Plan. Sampling practices included efforts to detect floating product and hydrocarbon vapors at each well, measurement of the static water level and total depth of each well for calculating pre-sampling evacuation volumes, purging and sampling of groundwater for laboratory analysis, decontamination of sampling equipment, and handling of sample-filled containers in accordance with Section 4.3.3.5 of the RFI Work Plan. In general, these procedures were consistent with previous quarterly sampling by Kleinfelder. Details of previous procedures have been discussed in prior Quarterly Sampling Reports.

2.1.1 Organic Vapor Check

Standard field procedures include checking the interior of each well with a photoionization detector (PID) (equipped with a 10.0 eV lamp) for the presence of organic vapors whenever the well casing is opened. With the sampling team members standing upwind of the well, the well cap was opened slightly, allowing for the insertion of the PID probe tip inside the well. Readings were monitored until they stabilized, which was usually at zero parts per million (ppm). The final reading, as well as the peak reading, were recorded in the field log book. The cap was then removed and the well allowed to vent for a short period of time prior to measuring the static water level. The maximum PID readings taken during the collection of water level measurements are shown in Table 5-1 in Section 5.

2.1.2 Detection of Immiscible Layers

In order to detect the presence of floating, immiscible layers on top of the groundwater surface, a clear bailer was lowered approximately one-half the length of the bailer below the surface of the water in each well. The bailer was removed from the well and its contents checked for immiscible layers or iridescence. The PID probe was also inserted inside the bailer to check for volatile emissions. If immiscible fluids had been detected, a sample would have been collected for laboratory analysis of purgeable halocarbons and aromatics (EPA Method 8260) and total petroleum hydrocarbons (California Department of Health Services [CA DHS] Method). The bailer was decontaminated and the sampling line discarded after each use. As in all previous quarterly groundwater sampling at the PTI facility by CDM, immiscible layers were not detected during the July 1999 sampling event.

2.1.3 Static Water Level/Well Depth Measurement

On July 20, 1999, prior to the initiation of on-site well pumping, the static water level at 22 of the 24 on-site wells was measured three times at each well location with a decontaminated electric water level indicator (sounder) and recorded. The measurements collected in the wells were identical, therefore, there was no need to collect additional measurements or average the data of these wells. The results of these measurements are shown in Table 5-1 and discussed in Section 5. One well (MW-06A) was dry, and MW-02 was not measured due to its proximity to MW-12S.

The water level in each well was also measured immediately prior to initiating well evacuation procedures for calculation of well purge volume. During measurement, the measuring (reference) point used was noted (i.e., the top of the steel casing), and the depth to water below the reference point was measured to the nearest 0.01 foot and recorded in the field log book. Well head elevation data was used with depth to water measurements to calculate groundwater elevation at each well location.

The bottom of each well sampled was also measured with the sounder to the nearest 0.1 foot. The amount of fill material in the bottom of the well was calculated from well construction data and noted in the log book. Prior to first use, the sounder was calibrated and the meter response checked. The sounder probe and line were decontaminated after each use.

2.1.4 Purge Volume Determination/Well Evacuation

Saturated casing volume was calculated at each well by using the depth to water and bottom sounding measurements obtained immediately prior to purging, to calculate the amount (height) of the saturated well casing. The inside diameter of the casing was then measured, and the following formula applied:

$$\text{Volume} = \pi \text{ radius}^2 \text{ x height}$$

A minimum of three saturated casing volumes of water were evacuated from each well prior to collecting a groundwater sample for laboratory analysis.

During the July 1999 sampling round, all 14 of the wells currently monitored were purged using a Grundfos 2-inch diameter submersible pump, and each well was sampled using a new disposable bailer.

For measurement of field parameters during well evacuation, a LeMotte Model 2020 turbidity meter, an Orion 250A pH meter, and a YSI Model 33 electrical conductivity (EC)/temperature meter were used. The instruments were calibrated or field checked prior to use with standard solutions in accordance with manufacturer's directions. The meters are used to determine the stability of discharge water field parameters prior to collection of a sample for laboratory analysis.

Periodically during well evacuation, the field parameters of the discharge water were measured and recorded in the log book. The physical appearance of the water (turbidity, color, sediment content, etc.) was also noted and recorded. Initial field turbidity measurements generally ranged from 1.1 to 190 NTUs (nephelometric turbidity units) at the start of well evacuation. At the end of well

evacuation, measurements were generally less than 10 NTUs. Higher turbidity at the start of purging seems to be related to agitating the water column and resuspending material from the bottom of the well during pump installation. After a minimum of three saturated casing volumes of water were evacuated from each well and the field parameters stabilized (change between readings of less than 5 to 10 percent), a sample for laboratory analysis was collected.

All purge water collected from each well was discharged directly into 55-gallon barrels for treatment by PTI in the facility's wastewater treatment system.

2.1.5 Sample Collection and Handling

Groundwater samples were collected with a disposable bailer from the approximate middle of the perforated section, and poured directly into previously-labeled sample bottles. During sample collection, the bailer was carefully and gently lowered past the air/water interface to minimize agitation and aeration of water during sample collection. The sample bottles were placed inside plastic zip-lock bags and then placed immediately into an ice-cooled chest. Prior to shipment, the bottles were cushioned with bubble wrap or plastic bags to avoid breakage. Samples collected for total metals analysis were field filtered using a 0.45 micron filter. Filters were discarded after each use.

The July 1999 groundwater samples were collected for laboratory analysis of the following parameters:

- Halogenated/Aromatic Volatile Organic Compounds by EPA method 8260
- Metals (Cd, Cu, and Cr)
- Hexavalent Chromium (Cr^{+6})
- pH

Groundwater sample bottles were numbered using the following format:

PTI-MW01S-044

Where:

PTI	-	designates site acronym
MW01S	-	designates sample location number (MW = Monitoring Well)
EB	-	designates equipment blank sample
TB	-	designates travel blank sample
044	-	designates sequential sample number (per sampling event)

This was the 43nd round of sampling conducted by CDM, however, due to a previous labeling inconsistency, a 044 sequence number was assigned to all groundwater samples collected during this round. Sample label information included date and time of sampling, CDM sample number, and analytical parameters.

All filled sample containers that were collected from each well were accompanied by chain-of-custody forms that indicated the label information as well as the responsible person during each step of the transportation process. All samples were sent by courier to Quanterra Laboratories in

Santa Ana, California on the day that they were collected, and a copy of the chain-of-custody form for that day was retained by CDM field personnel. Copies of completed chain-of-custody forms are included in Appendix C. The laboratory was notified at the time of delivery that one or more hexavalent chromium (Cr^{+6}) sample(s) were contained in the shipment to ensure that the samples would be analyzed within the prescribed 24-hour holding period.

2.2 Equipment Decontamination Procedures

The following sections describe the procedures utilized to decontaminate groundwater sampling equipment.

2.2.1 Sampling Pump/Lines Decontamination

The submersible pump and discharge tubing used for well purging were decontaminated to reduce the possibility of cross-contamination between monitoring wells. The first step in the decontamination procedure was to submerge the pump into a decontaminated 5-gallon bucket containing a soap (Alconox, a laboratory-grade detergent) and water mixture, and pump at least five gallons of the solution through the system. The pump assembly was then submerged in another 5-gallon bucket filled with tap water and at least 10 gallons were pumped through the system. The final decontamination step was accomplished by submerging the pump into a decontaminated 5-gallon bucket containing deionized (DI) water and pumping approximately five gallons of DI water through the system.

The exterior of the pump and discharge tubing was steam cleaned, as well as the exterior of the reel holding the tubing. The decontamination of the exterior pump line was performed over a plastic waterproof tarp. The tarp was placed on a gently sloping surface and bermed up at the edges, allowing the decontamination water to flow away from the equipment being cleaned. The spent water was recovered and stored in 55-gallon drums for treatment by PTI in the facility's wastewater treatment system.

2.2.2 Accessory Sampling Equipment Decontamination

Accessory sampling equipment such as the metals filter apparatus, bailer, and water level sounder were also decontaminated to minimize the possibility of cross-contamination between the monitoring wells. The filter apparatus, bailer, and sounder were decontaminated first by washing in a bucket of soap and water, followed by a tap water rinse, followed by a final DI water rinse. Bailers used to test for an immiscible layer were decontaminated and reused. The bailers and nylon rope that were used to sample wells were discarded immediately after use.

Section 3
Laboratory Testing

Analytical and duplicate testing of groundwater samples collected during the July 1999 monitoring event was provided by Quanterra Laboratories of Santa Ana, California. During the July 1999 quarterly sampling event, a total of 21 water samples were submitted for laboratory analysis. Fourteen monitoring well samples and two blind duplicate samples from MW-04 and MW-09 were collected and submitted to Quanterra for analysis of purgeable halocarbons/aromatics (EPA Method 8260), cadmium, total and hexavalent chromium, copper, and pH. In addition, two equipment blank samples were submitted for analysis of the above parameters. Three travel blanks (TB) were also submitted to Quanterra for analysis of purgeable halogenated/aromatic organics.

The July 1999 groundwater analytical results are discussed in Section 6 and summarized in Tables 6-1 through 6-4. Quality assurance analytical results (duplicates, equipment blanks, and travel blanks) are discussed in Section 4.0 and summarized in Tables 4-1 through 4-4. Individual analytical reports for July 1999 are contained in Appendix B.

Section 4
Quality Assurance

To verify the accuracy and validity of analytical data, certain quality assurance procedures were implemented. The field and laboratory quality assurance results were checked for deviations from the Quality Assurance (QA) guidelines discussed in the RFI Work Plan.

4.1 Field Quality Assurance

The field QA procedures included the use of duplicate samples, equipment blanks, travel blanks, and the use of chain-of-custody forms. The results of the QA analyses have been compiled by type of parameter: purgeable halogenated organics, purgeable aromatic organics, and inorganics, in Tables 4-1 through 4-3, respectively. Table 4-4 lists quality assurance results which are outside the ranges specified in the RFI Work Plan. Detection limits of parameters analyzed are shown in the analytical reports contained in Appendix B.

4.1.1 Duplicate Samples

Standard accepted practice is to submit one duplicate sample for analysis for approximately every tenth sample collected, a ratio of 1 to 10. During the July 1999 round of sampling, duplicate samples were collected from monitoring wells MW-04 and MW-09. The duplicate samples were submitted to the analytical laboratory as blind samples, and were designated MW-35 and MW-37, respectively, on the chain of custody forms. Monitoring wells MW-04 and MW-09 were selected due to elevated concentrations of certain contaminants detected during previous sampling rounds. Analytical results for the duplicate samples for July 1999 are shown in Tables 4-1, 4-2, and 4-3.

Duplicate results which deviate greater than 20% from the original results are shown in Table 4-4. There was a 80% difference in 1,1,1-TCA between sample PTI-MW-09-044 and its duplicate, PTI-MW-37-044. There was a 21% difference in methylene chloride between sample PTI-MW04-044 and its duplicate, PTI-MW35-044.

4.1.2 Equipment Blanks

Analytical results for the equipment blanks collected during July 1999 are shown in Tables 4-1, 4-2 and 4-3.

Equipment blank EB-01 was obtained by allowing deionized water to run through a new, precleaned, disposable bailer. The other equipment blank (EB-02) was obtained by pouring deionized water over the submersible pump after decontamination. The samples were collected in the appropriate containers and submitted for laboratory analysis. Sample EB-01 was collected to evaluate the effectiveness of the factory cleaning process. Sample EB-02 was collected following pump decontamination after sampling well MW-16. The equipment blanks were submitted to the laboratory for analysis of purgeable halogenated/aromatic volatile compounds (EPA Method 8260), cadmium, chromium (total and hexavalent), copper, and pH. The analytical results did not indicate any detections above the method detection limits in either equipment blank.

4.1.3 Travel Blanks

The detection of compounds in travel blanks is generally indicative of systematic contamination from sample transport, laboratory glassware cleaning, laboratory storage, or analytical procedures. During the July 1999 sampling event, three laboratory-prepared travel blanks (TB01 through TB03) consisting of organic-free water were labeled and submitted to the lab for purgeable halocarbon and aromatic volatile organic analysis by EPA Method 8260. Each travel blank was stored with the day's samples, to be analyzed for volatile organic compounds.

Tables 4-1 and 4-2 show the results of the travel blank analyses. The analytical results indicated that methylene chloride, a common laboratory contaminant, was detected above the method detection limit in two of the three travel blanks (TB02 and TB03). Methylene chloride was detected at much higher concentrations in samples PTI-MW04-044 and PTI-MW09-044 collected on the same days as TB02 and TB03 respectively. However, because no other samples collected on the same days, including equipment blanks, contained any detectable concentrations of methylene chloride, it is likely that the presence of methylene chloride in the travel blanks was due to laboratory contamination.

4.1.4 Sample Control

All sample containers were labeled immediately prior to sampling with the sample identification information completed with a waterproof pen. Samples were transported under chain-of-custody and hand delivered by courier to the laboratory in ice-cooled chests. Copies of the chain-of-custody records are included in Appendix C.

4.2 Laboratory Quality Assurance

General QA procedures for Quanterra Laboratory, which performed laboratory analysis on all monitor well and quality assurance samples, are discussed in the RFI report. Quanterra provides internal laboratory QA/QC results with each sample analytical report. Matrix spike, matrix spike duplicate, method blank, and duplicate control sample results are noted in the QA/QC reports. In addition, surrogate recoveries are also noted for volatile organics analyses. The laboratory QA/QC results were within acceptable limits for the July 1999 sampling. The laboratory control sample results were also within acceptable limits.

TABLE 4-1
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring Well Sampling
Quality Assurance Samples
Purgeable Halogenated Organic Analytical Results
(ug/L)

Sample Identification	Tetrachloro-ethene (PCE)	Trichloro-ethene (TCE)	1,1-Dichloro-ethene (1,1-DCE)	1,1-Dichloro-ethane (1,1-DCA)	1,2-Dichloro-ethane (1,2-DCA)	Chloroform (CHCL3)	cis-1,2-Dichloro-ethene (cis-1,2-DCE)	1,1,1-Trichloro-ethane (1,1,1-TCA)	Methylene chloride (CH2CL2)
PTI-EB01	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-EB02	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-MW04	ND <10	**140**	**36**	**58**	**87**	ND <10	**100**	ND <10	**38**
PTI-MW04-DUP	**12**	**150**	**42**	**68**	**77**	**11**	**120**	ND <10	**46**
PTI-MW09	ND<25	**810**	**190**	**780**	**140**	**440**	**50**	ND <25	**1400**
PTI-MW09-DUP	ND<25	**860**	**200**	**770**	**150**	**490**	**51**	**45**	**1300**
PTI-TB01	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-TB02	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	**6.6**
PTI-TB03	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	**6.5**

All analyses performed by EPA Method 8260.
ND = Analytical parameter not detected
MW = Monitoring Well
MW-DUP = Monitoring Well - Duplicate
EB01 = Equipment Blank collected from a new disposable bailer.
EB02 = Equipment Blank collected from the submersible pump.
TB = Travel Blank

TABLE 4-2
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring Well Sampling
Quality Assurance Samples
Purgeable Aromatic Organic Analytical Results
(µg/L)

Sample Identification	Benzene	Toluene	Ethyl-benzene	Xylenes (Total)
PTI-EB01	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-EB02	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-MW04	ND<10	ND<10	**670**	**67**
PTI-MW04-DUP	ND<10	ND<10	**550**	**60**
PTI-MW09	ND <25	ND <25	ND <25	ND <25
PTI-MW09-DUP	ND <25	ND <25	ND <25	ND <25
PTI-TB01	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-TB02	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI-TB03	ND <1.0	ND <1.0	ND <1.0	ND <1.0

All analyses performed by EPA Method 8260.
ND = Analytical parameter not detected.
NA = Parameter not analyzed.
MW = Monitoring Well
MW-DUP = Monitoring Well - Duplicate
EB01 = Equipment Blank collected from a new disposable bailer.
EB02 = Equipment Blank collected from the submersible pump.
TB = Travel Blank

TABLE 4-3
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring Well Sampling
Quality Assurance Samples
Inorganic Analytical Results
(mg/L)

Well Identification	Cadmium EPA- 6010B	Chromium (Hexavalent) EPA- 7196A	Chromium (Total) EPA-6010B	Copper EPA-6010B	pH EPA-150.1
PTI-EB01	ND <0.0050	ND < 0.020	ND <0.010	ND < 0.025	**5.30**
PTI-EB02	ND <0.0050	ND < 0.020	ND <0.010	ND < 0.025	**5.70**
PTI-MW04	**0.42**	**41.1**	**49.7**	ND <0.050	**6.90**
PTI-MW04-DUP	**0.42**	**48.5**	**50.6**	ND <0.050	**6.90**
PTI-MW09	ND < 0.010	**5.8**	**5.6**	ND < 0.050	**6.60**
PTI-MW09-DUP	ND < 0.010	**6.0**	**5.5**	ND < 0.050	**6.60**

ND = Analytical parameter not detected.
NA = Parameter not analyzed.
MW = Monitoring Well
MW-DUP = Monitoring Well - Duplicate
EB01 = Equipment Blank collected from a new disposable bailer.
EB02 = Equipment Blank collected from the submersible pump.

TABLE 4-4
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring Well Sampling
Quality Assurance Deviations

Quality Assurance Criteria	Cadmium (mg/l)	Chromium, Hexavalent (mg/l)	Chromium, Total (mg/l)	Copper (mg/l)	Benzene (ug/l)	Toluene (ug/L)	Ethyl-Benzene (ug/l)	Xylenes, Total (ug/l)	Halogenated Volatile Organic Compounds (ug/l)
Equipment Blanks									
PTI-EB01- 044									
PTI-EB02- 044									
Travel Blanks									
PTI-TB01- 044									
PTI-TB02- 044									**6.6** (Methylene Chloride)
PTI-TB03- 044									**6.5** (Methylene Chloride)
Laboratory Blanks									
Method Blank									
Duplicate Deviation (>20%)									
PTI-MW04- 044									**21%**
PTI-MW09- 044									**80%**
Holding Time Exceedance									

EB01 = Equipment Blank collected from a new disposable bailer.
EB02 = Equipment Blank collected from the submersible pump.
TB = Travel Blank

Section 5
Groundwater Elevation

On July 20, 1999, prior to the initiation of well evacuation procedures, the depth to groundwater was measured in 22 of the 24 on-site monitoring wells. Groundwater elevations were calculated by subtracting the depth to static water level from the surveyed elevation of the corresponding monitoring well.

All of the monitoring well casing elevations were surveyed during the RFI and three wells (MW-04, MW-09, and MW-10) were resurveyed in January 1996 following wellhead repair. In July 1998, wellhead repairs were performed on wells MW-03, MW-06A, MW-06B, MW-06D, MW-08, MW-11, MW-12S, MW-12D, MW-13S, MW-13D, and MW-16. These wells were resurveyed during the July 1998 monitoring event.

During the July 1999 groundwater sampling round, water level measurements were taken at shallow wells MW-01S, MW-03, MW-04, MW-05, MW-06B, MW-07, MW-08, MW-09, MW-10, MW-11, MW-12S, MW-13S, MW-14S, MW-15S, and MW-16. Water level measurements were also taken at deep wells MW-01D, MW-04A, MW-06D, MW-12D, MW-13D, MW-14D, and MW-15D. These wells were measured in order to evaluate the direction and gradient of groundwater flow underlying the facility and to help characterize the shallow and deep aquifer interaction. Well MW-02 was not measured due to its proximity to MW-12S. Well MW-06A was measured and found to be dry.

Table 5-1 lists the depths to water and groundwater elevations for each well sampled. Figure 5-1 shows the approximate groundwater surface elevation of the upper Hollydale Aquifer for wells screened in the shallow interval (45 to 77 feet below ground surface) using data collected during the July 1999 sampling round. The contours shown in Figures 5-1 and 5-2 were generated by D.C.A., a surface contouring software developed by Softdisk, which is commonly used in conjunction with CADD (Computer Aided Drafting and Design) to produce contour maps and other graphics.

The direction of groundwater flow as observed in the shallow monitoring wells is approximately S 45° W at an average gradient of 0.32 feet per 100 feet in the western portion of the facility, where the majority of the monitoring wells are located. The gradient in the shallow wells has decreased compared to the April 1999 gradient of 0.39 feet per 100 feet. The flow direction has a decreased westward component from that obtained in April 1999 (S 57° W).

Figure 5-2 shows the approximate groundwater elevation of the lower Hollydale Aquifer for wells screened in the deeper interval (78.3 to 123.5 feet below ground surface). Groundwater contours for the deeper wells follow the same general trend as those of the shallow wells. The direction of groundwater flow is approximately S 48°W at an average gradient of 0.31 feet per 100 feet. As with the shallow wells, the gradient in the deep wells has decreased compared to the April 1999 gradient of 0.40 feet per 100 feet, and the flow direction has a decreased westward component from that obtained in April 1999 (S 57°W).

TABLE 5-1
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring Well Sampling
Groundwater Elevation Data

Well No.	Well Headspace* (ppm)	Total Depth Constructed (ft)	Total Depth Measured (ft)	Perforated Intervals (ft)	Calculated Casing Fill (ft)	M.P. Elevation (ft)	Depth to Water (ft below MP)	G.W. Elevation (ft above MSL)
1S	2.1 / 0.0	62.5	62.4	47-62.5	---	152.63	39.01	113.62
1D	1.2 / 0.0	94.8	95.9	79.5-94.5	---	152.60	38.93	113.67
3	7.3 / 1.7	74.1	73.3	45-75	0.8	154.75	42.44	112.31
4	16.8 / 1.4	67.5	67.3	45-75	---	152.37	40.04	112.33
4A	1.7 / 1.4	107.0	106.6	87-107	0.4	152.46	40.00	112.46
5	1.7 / 1.4	75.0	---	45-75	---	153.26	41.31	111.95
6A	128.6 / 1.4	---	---	10-30	---	---	DRY	---
6B	1.4 / 1.4	77.6	76.9	45-75	0.7	149.53	37.10	112.43
6D	17.0 / 0.4	95.5	93.5	79-94	2.0	150.13	37.70	112.43
7	4.3 / 1.4	71.5	71.5	45-75	0.0	149.42	37.33	112.09
8	38.0 / 0.8	71.0	---	41-71	---	150.17	37.63	112.54
9	15.1 / 0.8	73.5	73.5	44-77	0.0	152.96	40.39	112.57
10	29.3 / 1.4	75.0	---	45-75	---	153.89	41.24	112.65
11	6.4 / 2.4	75.5	73.8	55-75	1.7	155.76	42.88	112.88
12S	7.3 / 1.4	72.0	---	51-72	---	155.79	42.55	113.24
12D	1.7 / 1.4	101.0	---	84.5-100	---	155.72	42.58	113.14
13S	5.2 / 2.1	70.3	---	50.3-70.3	---	151.72	38.71	113.01
13D	2.4 / 2.4	93.3	---	78.3-93.3	---	151.68	38.68	113.00
14S	17.2 / 1.4	71.5	70.7	46-72	0.8	150.50	38.31	112.19
14D	1.4 / 1.4	109.0	---	88-103	---	150.56	38.37	112.19
15S	1.7 / 1.4	71.5	71.4	51.5-71.5	0.1	151.01	39.12	111.89
15D	1.4 / 1.4	123.8	123.9	108.5-123.5	---	150.96	39.22	111.74
16	10.2 / 1.4	62.5	62.0	42-62	0.5	150.27	37.84	112.43

M.P. = Measuring point (top of steel casing)
G.W. = Groundwater
--- = Not measured or not calculated.

MSL = mean sea level
* = Measured with PID prior to sampling (casing/background)
Note: Depth to water measurements collected on July 20, 1999 prior to purging/sampling on-site wells.

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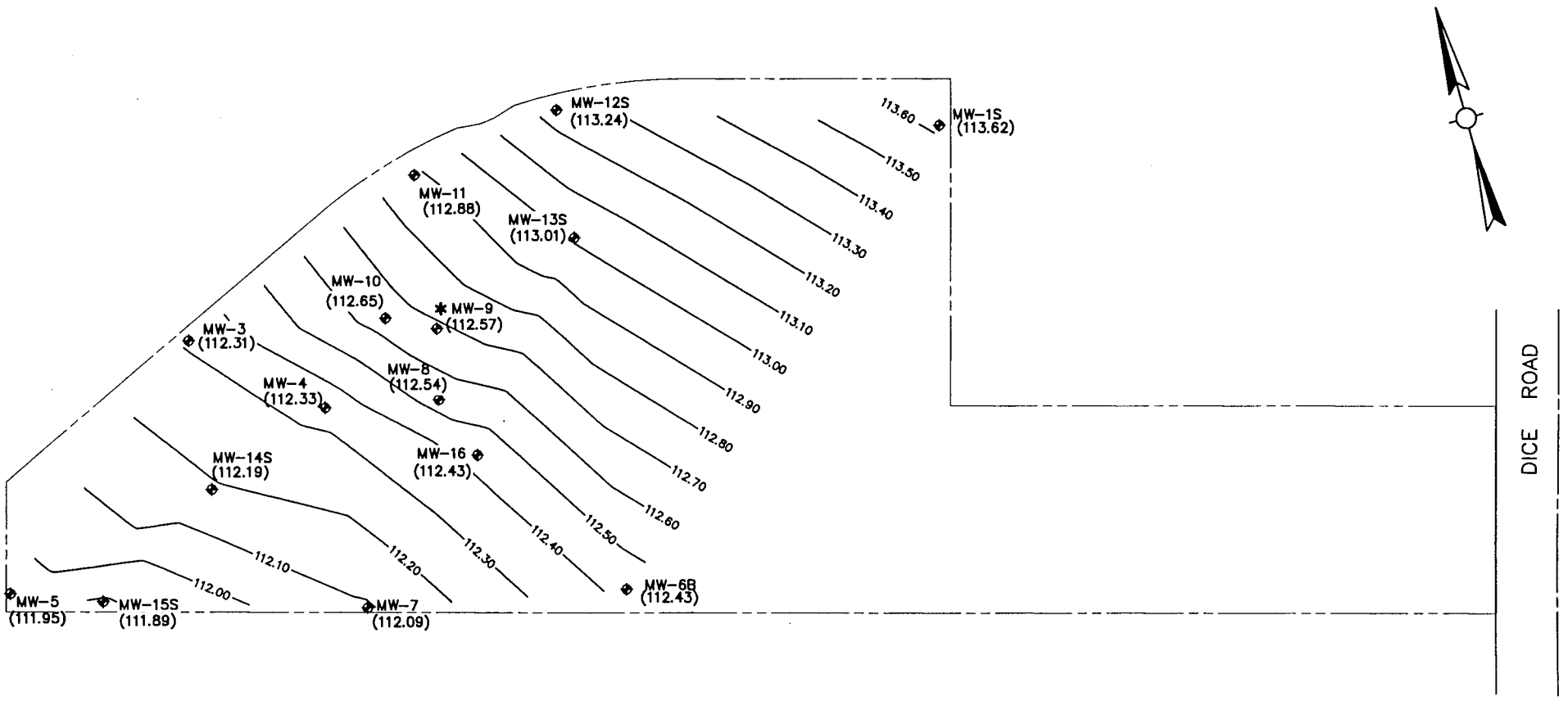

LEGEND

———	PROPERTY LINE
◆	MONITORING WELL
(111.95)	GROUNDWATER ELEVATION (Feet Above MSL)
—113.00—	GROUNDWATER ELEVATION CONTOUR LINE (Feet Above MSL)
*	ANOMALOUS VALUE, NOT CONTOURED

1" = 100'

50 0 100

PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

Groundwater Elevation Contours - Shallow Wells
July 1999

CDM
environmental engineers, scientists, planners, & management consultants

Figure 5-1

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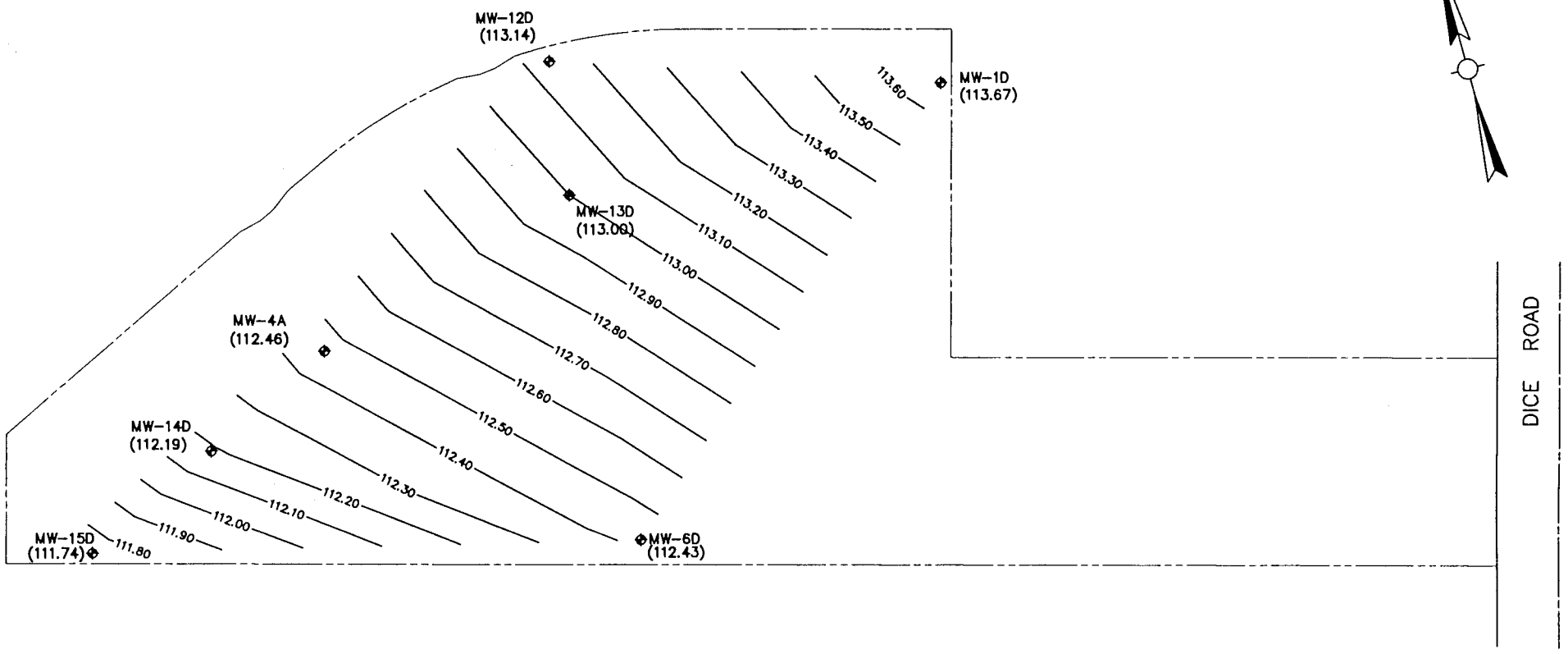

LEGEND

———	PROPERTY LINE
◆	MONITORING WELL
(111.74)	GROUNDWATER ELEVATION (FEET ABOVE MSL)
113.00	GROUNDWATER ELEVATION CONTOUR LINE (FEET ABOVE MSL)

1" = 100'

50 0 100

PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

Groundwater Elevation Contours - Deep Wells
July 1999

CDM
environmental engineers, scientists, planners, & management consultants

Figure 5-2

With the 23 wells measured for water levels during the July 1999 sampling round, there were seven locations where a deep well was measured adjacent to a shallow well. Shallow wells are screened within the interval of 45 to 77 feet. Deep wells are screened within the interval of 78.3 to 107 feet, with the exception of MW-15D which is screened from 108.5 to 123.5 feet. Of the well pairs, groundwater elevations at deep wells MW-12D, MW-13D and MW-15D were slightly lower (0.10 feet, 0.01 feet, and 0.15 feet, respectively) than the corresponding shallow well elevations. The groundwater elevations at deep wells MW-1D and MW-4A were slightly higher (0.05 and 0.13 feet, respectively) than the corresponding shallow well elevations. Well pairs MW-6D and MW-14D had the same groundwater elevations. Based on these and past groundwater elevation comparisons among shallow and deep well pairs, it does not appear that a well-defined vertical gradient between shallow and deep intervals exists.

Average groundwater elevations during the July 1999 sampling event decreased on from the previous quarter. Water level decreases ranged from a minimum of 0.02 feet at wells MW-7, MW-14S, and MW-14D, to a maximum of 0.39 feet at MW-1S. Water level increases ranged from a minimum of 0.04 ft at wells MW-15S, to a maximum of 0.25 ft at well MW-5.

Section 6
Groundwater Quality

In order to compare the analytical data from the previous sampling events (1989 through April 1999 quarterly events) with the July 1999 data, Table 6-1 was compiled. This table compares groundwater analytical parameters (hexavalent and total chromium, cadmium, copper, purgeable aromatics and trichloroethene), and groundwater elevations at shallow well locations which were sampled during July 1999. Laboratory analytical reports from all wells sampled during the July 1999 sampling round are located in Appendix B.

Consistent with the results of laboratory testing performed on the groundwater samples collected since January 1989 from the on-site monitoring wells, three contaminant plumes in the Hollydale Aquifer were identified. Historically, these plumes have been present at varying concentrations and lateral extent. One small plume, consisting primarily of site-specific metals parameters, has been aligned in a northeasterly to southwesterly direction in the vicinity of wells MW-04 and MW-14S. The second, consisting of purgeable aromatics, has also been aligned in a northeasterly to southwesterly direction with the highest concentrations generally found in wells MW-04 and MW-09. The third plume consists of trichloroethene and related parameters with highest concentrations generally detected in wells MW-04, MW-09, MW-11, and MW-14S.

6.1 Purgeable Halogenated Organic Compounds

Table 6-2 shows the analytical results for purgeable halogenated organic compounds in deep and shallow wells during July 1999. Trichloroethene was the primary compound detected, with miscellaneous other halogenated organics also detected. The table also shows, for comparison purposes, maximum contaminant limits (MCLs) and concentrations for water supply wells in the Santa Fe Springs area. The supply wells, however, are likely screened much deeper than the wells at PTI. The City of Santa Fe Springs Annual Water Quality Report for 1996 (the most recent report available) is contained in Appendix D of this document.

Trichloroethene

Trichloroethene (TCE) was detected in all 14 of the groundwater monitoring wells sampled during July 1999. The highest concentration of TCE detected in July 1999 was 810 µg/L in well MW-09, an increase from the result of 350 µg/L in April 1999. The second highest concentration of TCE detected was 740 µg/L in well MW-11, an increase from the result of 480 µg/L in April 1999. The third highest concentration of TCE detected was 140 µg/L in well MW-04, a decrease from the result of 190 µg/L in April 1999.

Detected concentrations of TCE in the majority of the remaining shallow wells increased slightly in July 1999 from the results in April 1999, and ranged in concentration from 3.9 µg/L in MW-15S to 74 µg/L in MW-14S. Deep well detections increased in wells MW-01D and MW-06D and decreased in wells MW-04A and MW-15D. TCE concentrations in the deep wells ranged from 2.7 µg/L in MW-01D to 23 µg/L in MW-06D. Concentrations for TCE detected in shallow and deep wells are shown on Figures 6-1 and 6-2, respectively.

TABLE 6-1
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring
Historical Results

		METALS				PURGEABLE AROMATICS				PURGEABLE HALOCARBONS
Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)
MW - 1S										
Jan-89	96.74	ND < 0.01	0.014	ND < 0.003	ND < 0.009	ND < 0.01	ND < 0.0	ND < 0.0	ND < 0.0	19
Apr-89	100.45	ND < 0.05	0.1	ND < 0.01	ND < 0.02	ND < 0.7	ND < 1.0	ND < 1.0	3.0	23
Jul-89	99.00	ND < 0.05	0.06	0.01	0.03	ND < 0.7	ND < 1.0	ND < 1.0	ND < 1.0	13
Oct-89	96.76	ND < 0.05	ND < 0.02	ND < 0.01	ND < 0.05	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	12
Jan-90	97.73	ND < 0.02	ND < 0.01	ND < 0.01	ND < 0.02	ND < 0.5	ND < 0.5	ND < 0.5	ND < 1.0	16
Apr-90	99.30	ND < 0.02	0.02	ND < 0.0050	0.02	ND < 2.5	ND < 2.5	ND < 2.5	ND < 5.0	20
Jul-90	100.83	ND < 0.02	ND < 0.01	ND < 0.01	0.03	ND < 0.5	ND < 0.5	ND < 0.5	ND < 1.0	18
Oct-90	99.81	ND < 0.02	ND < 0.01	ND < 0.0050	0.023	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	18
Jan-91	99.19	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	26
Apr-91	101.95	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	22
Jul-91	102.94	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	17
Oct-91	102.33	ND < 0.02	0.01	ND < 0.0050	0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Jan-92	104.60	0.10	0.0081	ND < 0.0027	0.04	ND < 1	1.5	1.2	4.3	13
Apr-92	107.28	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 0.5	ND < 0.5	ND < 0.5	9.9
Jul-92	107.87	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	10
Oct-92	105.53	ND < 0.02	ND < 0.01	ND < 0.0050	0.035	0.95	ND < 1.0	ND < 1.0	ND < 1.0	11
Jan-93	109.82	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	2.2	1.3	5.6	9.2
Apr-93	116.01	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	5.7
Jul-93	116.59	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	1.7	1.7	4.0	11
Oct-93	116.50	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	2.2	4.3	14
Jan-94	116.60	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	9.3
Apr-94	117.10	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Jul-94	117.80	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	7.9
Oct-94	112.23	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	5.8	13
Jan-95	113.59	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	5.2
Apr-95	118.78	ND < 0.02	0.0029	ND < 0.01	ND < 0.02	ND < 0.5	ND < 1.0	1.3	1.0	4.4
Jul-95	120.06	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	1.2	3.5	6.1	6.2
Oct-95	116.48	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	1.7	3.9	15
Jan-96	114.84	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	1.7	5.1	8.4
Apr-96	118.03	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	3.4	4.9	2.9
Jul-96	117.42	ND < 0.01	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	2.2	3.7	9.7
Oct-96	113.85	ND < 0.01	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	2.1	2.8	16
Jan-97	115.73	ND < 0.02	ND < 0.01	ND < 0.0050	0.022	ND < 0.5	ND < 1.0	ND < 1.0	2.0	6.0
Apr-97	118.21	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	1.4	1.2	15
Jul-97	118.18	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Oct-97	114.82	ND < 0.02	ND < 0.01	ND < 0.0050	0.023	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	12
Jan-98	113.23	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	12
Apr-98	118.16	ND < 0.02	ND < 0.01	ND < 0.0050	0.021	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Jul-98	119.12	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	14
Oct-98	116.57	ND < 0.02	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	7.8
Jan-99	113.94	ND < 0.01	ND < 0.01	ND < 0.0050	ND < 0.02	ND < 0.5	ND < 1.0	2.0	ND < 1.0	10
Apr-99	114.01	ND < 0.025	ND < 0.01	ND < 0.0050	ND < 0.025	ND < 1.0	ND < 1.0	ND < 1.0	ND < 2.0	7.2
Jul-99	113.62	ND < 0.020	ND < 0.010	ND < 0.0050	0.052	ND <1.0	ND <1.0	ND <1.0	ND <1.0	9.1

TABLE 6-1
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE AROMATICS				HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)
MW - 3										
Jan-89	95.02	ND < 0.01	0.014	0.003	ND < 0.009	7.4	17.0	4900.0	1500.0	74
Apr-89	99.29	ND < 0.5	0.07	ND < 0.01	ND < 0.02	ND < 50	ND < 50.0	1200.0	60.0	110
Jul-89	98.21	ND < 0.5	0.06	ND < 0.01	ND < 0.02	ND < 7	ND < 10.0	ND < 10.0	ND < 10.0	120
Oct-89	94.75	ND < 0.5	ND < 0.02	ND < 0.01	ND < 0.05	ND < 50	ND < 100.0	1600.0	150.0	ND< 100
Jan-90	95.98	ND < 0.02	ND < 0.01	ND < 0.01	ND < 0.02	ND < 5	ND < 5.0	110.0	ND < 10.0	65
Apr-90	97.72	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 50	ND < 50.0	2100.0	720.0	74
Jul-90	99.27	ND < 0.02	ND < 0.01	ND < 0.01	ND < 0.02	ND < 5	ND < 5.0	ND < 5.0	ND < 10.0	130
Oct-90	97.29	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	9	2.0	ND < 1.0	ND < 1.0	130
Jan-91	97.69	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	38
Apr-91	99.81	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	27
Jul-91	101.63	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	28
Oct-91	100.99	ND < 0.02	ND < 0.01	ND < 0.005	0.03	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	71
Jan-92	103.44	ND < 0.5	0.0081	ND < 0.0027	0.02	ND < 1	ND < 1.0	ND < 1.0	4.0	76
Apr-92	106.04	ND < 0.02	ND < 0.02	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 5.0	25
Jul-92	106.61	ND < 0.02	ND < 0.02	ND < 0.005	0.13	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	76
Oct-92	103.93	ND < 0.02	ND < 0.02	ND < 0.005	0.038	0.52	ND < 1.0	ND < 1.0	ND < 1.0	130
Jan-93	107.28	ND < 0.02	ND < 0.01	ND < 0.005	0.096	ND < 2.5	ND < 5.0	ND < 5.0	ND < 5.0	84
Apr-93	115.17	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	12
Jul-93	115.92	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	3.3	2.6	5.9	16
Oct-93	115.67	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	2.6	4.8	17
Jan-94	115.59	ND<0.02/0.4**	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	10
Apr-94	116.33	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	15
Jul-94	116.91	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	26
Oct-94	110.85	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	1.2	3.5	1.5	12.0	76
Jan-95	111.83	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	72
Apr-95	117.83	ND < 0.02	0.0023	ND < 0.001	ND < 0.02	ND < 0.5	ND < 1.0	1.3	ND < 1.0	57
Jul-95	119.20	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	2.0	5.2	8.8	9.5
Oct-95	115.45	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	1.7	3.3	30
Jan-96	113.41	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	5.1	26
Apr-96	116.73	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	2.6	3.6	46
Jul-96	116.33	ND < 0.01	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	1.8	9.0	12.0	17
Oct-96	112.45	ND < 0.01	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	5.4	6.2	21
Jan-97	114.19	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	2.6	1.1	4.2	28
Apr-97	117.13	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	4.3	2.1	3.0	13
Jul-97	117.18	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	2.5	3.7	13
Oct-97	113.60	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	0.57	ND < 1.0	1.7	1.2	24
Jan-98	111.68	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	1.3	ND < 1.0	25
Apr-98	116.82	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	18
Jul-98	118.02	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	25
Oct-98	115.40	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	ND < 1.0	ND < 1.0	24
Jan-99	112.48	ND < 0.02	ND < 0.01	ND < 0.005	ND < 0.02	ND < 0.5	ND < 1.0	2.3	ND < 1.0	26
Apr-99	112.49	ND < 0.025	ND < 0.01	ND < 0.005	ND < 0.025	ND < 1.0	ND < 1.0	1.1	ND < 2.0	21
Jul-99	112.31	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND <1.0	ND <1.0	1.3	ND <1.0	43

** Hexavalent chromium sample or result for MW03 likely switched with MW30 (dup. of MW04). Laboratory reported MW03 result of 0.4 mg/L and MW30 result of ND at a detection limit of 0.02 mg/L.

TABLE 6-1
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE AROMATICS				HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)
MW - 4										
Jan-89	95.21	33.0	400.0	0.028	ND< 0.009	ND< 0.5	10.0	15.0	29.0	120
Apr-89	99.19	43.0	100.0	0.05	0.02	ND< 5	23.0	15.0	50.0	280
Jul-89	98.19	120.0	98.0	0.08	0.06	ND< 14	ND< 20.0	140.0	40.0	290
Oct-89	94.92	110.0	120.0	0.07	ND< 0.05	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	250
Jan-90	95.87	109.0	95.1	0.12	ND< 0.02	ND< 12	ND< 12.0	ND< 12.0	ND< 25.0	220
Apr-90	97.50	81.7	80.7	0.13	0.02	ND< 10	ND< 10.0	ND< 10.0	ND< 20.0	280
Jul-90	99.20	100.0	101.0	0.35	ND< 0.02	ND< 50	ND< 50.0	1600.0	170.0	320
Oct-90	98.33	58.9	48.4	0.23	0.022	ND< 0.5	17.0	230.0	650.0	250
Jan-91	97.68	49.4	65.3	0.26	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	1200.0	180
Apr-91	100.50	23.8	18.4	0.076	ND< 0.02	ND< 0.5	ND< 1.0	730.0	ND< 1.0	170
Jul-91	101.47	39.1	78.5	0.61	ND< 0.02	ND< 0.5	16000.0	6700.0	18000	190
Oct-91	100.91	42.0	40.8	0.21	ND< 0.01	ND< 0.5	6900.0	4100.0	10000	ND< 400
Jan-92	103.33	41.0	34.0	0.47	0.045	ND< 250	18,000	10,000	17,200	ND< 250
Apr-92	105.94	32.2	29.2	0.84	0.053	6.7	7.2	960.0	1010.0	280
Jul-92	106.5	79.9	59.7	0.86	ND< 0.02	ND< 5	ND< 10.0	200.0	280.0	280
Oct-92	103.92	21.6	27.1	0.32	ND< 0.02	71	ND< 10.0	1300.0	230.0	230
Jan-93	107.13	16.4	27.4	0.28	ND< 0.02	ND< 130	10000.0	10000	19000	ND< 250
Apr-93	115	1.8	2.2	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	88.0	13.0	25
Jul-93	115.52	21.0	23.2	0.2	0.056	0.6	2.0	1.8	11.0	100
Oct-93	115.76	* 35.5/99.2	80.3	0.71	ND< 0.2	1.3	ND< 1.0	ND< 1.0	40.0	290
Jan-94	115.42	0.36	36.0	0.23	ND< 0.02	0.81	ND< 1.0	8.3	14.0	130
Apr-94	116.20	26.9	26.4	0.33	ND< 0.02	ND< 0.5	ND< 1.0	4.0	6.5	190
Jul-94	116.76	59.0	41.4	0.20	0.038	0.58	ND< 1.0	ND< 1.0	4.2	340
Oct-94	110.86	60.7	52.8	0.45	ND< 0.02	ND< 5	ND< 10.0	270.0	39.0	390
Jan-95	111.88	28.8	34.3	0.13	0.026	ND< 5	ND< 10.0	350.0	130.0	190
Apr-95	117.69	8.6	9.1	0.21	0.052	ND< 100	1600.0	1700.0	2900.0	67
Jul-95	119.05	* 28.1/20.8	29.6	0.27	*.10/ND<.02	ND< 10	* 270/410	* 260/380	* 890/1300	90
Oct-95	115.35	**30.8	28.9	0.38	ND< 0.02	ND< 2.5	ND< 5.0	75.0	21.0	150
Jan-96	113.37	25.7	32.4	0.19	ND< 0.02	ND< 50	100.0	2100.0	1400.0	160
Apr-96	116.65	* 32.2/24.6	38.0	0.60	ND< 0.02	ND< 25	680.0	1300.0	1400.0	130
Jul-96	116.17	50	58.9	0.28	ND< 0.02	ND< 50	ND< 100.0	1000.0	270.0	140
Oct-96	112.38	63.8	75.7	0.46	ND< 0.04	ND< 50	380.0	1100.0	1900.0	310
Jan-97	114.07	*45.9/34.9	34.5	0.54	0.02	ND< 6.2	ND< 12.0	1100.0	ND< 12.0	330
Apr-97	116.96	27.3	18.8	0.53	ND< 0.02	ND< 12	35.0	1300.0	620.0	150
Jul-97	117.04	36.0	35.2	0.62	ND< 0.02	ND< 5	ND< 10.0	810.0	110.0	150
Oct-97	113.46	73.8	85.3	0.64	ND< 0.08	ND< 5	ND< 10.0	460.0	31.0	230
Jan-98	111.66	39.2	44.0	0.53	ND< 0.02	ND< 5	ND< 10.0	530.0	420.0	180
Apr-98	116.69	7.2	14.1	0.43	ND< 0.02	2.9	ND< 5.0	320.0	ND< 5.0	92
Jul-98	117.95	16.3	18.9	0.32	ND< 0.02	ND< 12	ND< 25.0	1200.0	300.0	120
Oct-98	115.31	34.1	36.2	0.44	0.030	ND< 6.2	ND< 12.0	740.0	240.0	120
Jan-99	112.41	78.6	85.2	0.58	ND< 0.040	ND< 5.0	ND< 10	520.0	31.0	260
Apr-99	112.43	*0.57/4.6	42.8	0.41	ND< 0.050	3.5	ND< 2.5	220	9.9	190
Jul-99	112.33	41.1	49.7	0.42	ND < 0.050	ND <10	ND <10	670	67	140

* 35.5/99.2 = original sample/duplicate sample (both results presented because duplicate result deviation is >20%)

** Analyzed after holding time had expired.

TABLE 6-1
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE AROMATICS				PURGEABLE HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)
MW - 6B										
Jan-89	95.12	ND< 0.01	ND< 0.014	ND< 0.003	ND< 0.009	ND< 0.01	ND< 0.0	ND< 0.0	ND< 0.0	57
Apr-89	99.11	ND< 0.05	0.06	ND< 0.01	ND< 0.02	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	37
Jul-89	98.39	ND< 0.05	0.04	ND< 0.01	ND< 0.02	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	29
Oct-89	95.35	ND< 0.05	ND< 0.02	ND< 0.01	ND< 0.05	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	29
Jan-90	96.1	ND< 0.02	ND< 0.01	ND< 0.01	ND< 0.02	ND< 0.5	ND< 0.5	ND< 0.5	ND< 1.0	46
Apr-90	97.76	ND< 0.02	0.02	ND< 0.005	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	61
Jul-90	99.28	ND< 0.02	0.02	ND< 0.01	ND< 0.02	ND< 0.5	ND< 0.5	ND< 0.5	ND< 1.0	51
Oct-90	98.45	ND< 0.02	0.012	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	52
Jan-91	97.87	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	59
Apr-92	105.86	ND< 0.02	0.014	ND< 0.005	ND< 0.02	ND< 0.5	ND< 0.5	1.1	0.8	19
Jul-92	106.57	ND< 0.02	0.019	ND< 0.005	0.054	ND< 0.5	ND< 0.5	ND< 1.0	ND< 1.0	10
Oct-92	104.12	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	12.0	2.9	13.0	9.3
Jan-93	107.23	ND< 0.02	0.011	ND< 0.005	0.038	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	6.9
Apr-93	114.64	ND< 0.02	0.014	ND< 0.005	ND< 0.02	ND< 0.5	64.0	26.0	88.0	2.6
Jul-93	115.34	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	2.2	2.0	5.5	2.7
Oct-93	115.46	ND< 0.02	0.011	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	5.9
Jan-94	115.37	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	2.7
Apr-94	116.15	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	2.0
Jul-94	116.67	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.1	ND< 1.0	1.9	2.9
Oct-94	111.13	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.5	ND< 1.0	8.2	1.5
Jan-95	112.19	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1	110.0	89.0	110.0	8.6
Apr-95	117.42	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.6	9.1	6.2	2.3
Jul-95	118.93	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.1	4.0	5.1	8.8
Oct-95	115.45	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	1.0	2.6
Jan-96	113.47	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1	28.0	27.0	53.0	14
Apr-96	116.65	ND< 0.02	0.011	ND< 0.005	ND< 0.02	ND< 1	4.2	37.0	50.0	2.9
Jul-96	116.18	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	2.3	3.5	2.3
Oct-96	112.66	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.0	2.1	2.8	6.1
Jan-97	114.20	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	4.3	4.3	6.4	5.0
Apr-97	116.95	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	3.6	1.7	ND< 1.0	5.2
Jul-97	117.01	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	6.6
Oct-97	113.71	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	6.4
Jan-98	112.06	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	15.0	32.0	39.0	17.0
Apr-98	116.76	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.6	4.2	6.0	7.7
Jul-98	117.95	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	4.3
Oct-98	114.83	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	9.9
Jan-99	112.74	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	5.0	24.0	29.0	17.0
Apr-99	112.56	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.025	ND< 1.0	19	42	33.9	31
Jul-99	112.43	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND <1.0	ND <1.0	1.2	ND <1.0	8.2

TABLE 6-1
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE AROMATICS				PURGEABLE HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)
MW - 7										
Jan-89	89.47	ND< 0.01	ND< 0.014	ND< 0.003	ND< 0.009	ND< 0.5	1.4	1.2	3.6	35
Apr-89	98.83	ND< 0.05	0.02	ND< 0.01	ND< 0.02	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	47
Jul-89	97.90	ND< 0.05	0.03	ND< 0.01	ND< 0.05	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	25
Oct-89	94.72	ND< 0.05	ND< 0.02	ND< 0.01	ND< 0.05	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	44
Jan-90	95.58	ND< 0.02	ND< 0.01	ND< 0.01	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	39
Apr-90	97.32	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	46
Jul-90	98.85	ND< 0.02	ND< 0.01	ND< 0.01	ND< 0.02	ND< 1	ND< 1.0	ND< 1.0	ND< 2.0	34
Oct-90	98.02	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	19
Jan-91	97.41	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	1.8
Apr-91	100.06	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	30
Jul-91	101.20	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	53
Oct-91	100.62	ND< 0.02	ND< 0.01	ND< 0.005	0.01	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	54
Jan-92	102.90	0.07	ND< 0.0081	ND< 0.0027	0.14	ND< 1	ND< 1.0	ND< 1.0	ND< 1.0	120
Apr-92	105.54	ND< 0.02	0.013	ND< 0.005	0.032	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	55
Jul-92	103.13	ND< 0.02	0.095	ND< 0.005	0.21	ND< 1	ND< 2.0	ND< 2.0	ND< 2.0	53
Oct-92	103.68	ND< 0.02	0.063	ND< 0.005	0.65	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	98
Jan-93	106.82	ND< 0.02	0.033	ND< 0.005	0.19	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	73
Apr-93	114.54	ND< 0.02	0.011	ND< 0.005	ND< 0.02	ND< 1.2	ND< 2.5	90.0	5.6	23
Jul-93	115.14	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	ND< 10.0	210.0	ND< 10.0	43
Oct-93	115.23	ND< 0.2	ND< 0.01	ND< 0.005	0.02	0.82	ND< 1.0	7.2	ND< 1.0	44
Jan-94	115.08	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	1.4	ND< 1.0	33.0	ND< 1.0	53
Apr-94	115.88	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	200.0	ND< 5.0	96
Jul-94	116.44	ND< 0.02	ND< 0.01	ND< 0.005	0.023	0.88	ND< 1.0	7.7	1.2	140
Oct-94	110.69	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	5.1	5.5	98
Jan-95	111.59	ND< 0.02	ND< 0.01	ND< 0.005	0.026	ND< 0.5	7.0	8.7	10.0	170
Apr-95	117.24	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	1.3	ND< 1.0	26
Jul-95	118.63	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	2.1	3.4	53
Oct-95	115.08	ND< 0.02	0.014	ND< 0.005	0.079	0.74	ND< 1.0	3.8	1.4	98
Jan-96	112.98	ND< 0.02	ND< 0.01	ND< 0.005	0.043	1.0	4.2	4.9	10.0	85
Apr-96	116.39	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.3	11.0	14.0	37
Jul-96	115.83	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	1.0	ND< 1.0	1.6	2.7	87
Oct-96	112.17	ND< 0.01	ND< 0.01	ND< 0.005	0.036	0.96	ND< 1.0	1.4	1.5	150
Jan-97	113.76	ND< 0.02	ND< 0.01	ND< 0.005	0.029	ND< 0.5	ND< 1.0	1.7	2.8	95
Apr-97	116.62	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.1	1.2	ND< 1.0	63
Jul-97	116.74	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	0.56	ND< 1.0	ND< 1.0	ND< 1.0	54
Oct-97	111.27	ND< 0.02	ND< 0.01	ND< 0.005	0.025	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	85
Jan-98	111.47	ND< 0.02	0.01	ND< 0.005	0.044	ND< 0.5	2.2	5.2	6.8	97
Apr-98	116.38	ND< 0.02	0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	1.6	1.8	23
Jul-98	117.62	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	53
Oct-98	115.06	ND< 0.02	ND< 0.01	ND< 0.005	0.042	0.68	ND< 1.0	ND< 1.0	ND< 1.0	88
Jan-99	112.28	ND< 0.02	ND< 0.01	0.0056	0.05	ND< 1.2	ND< 2.5	ND< 2.5	ND< 2.5	160
Apr-99	112.11	ND< 0.01	ND< 0.01	ND< 0.005	0.042	ND< 2.0	3.0	11	6.8	80
Jul-99	112.09	ND < 0.020	ND < 0.020	ND<0.010	0.068	ND <1.0	ND <1.0	1.3	ND <1.0	65

TABLE 6-1
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE AROMATICS				HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)
MW-9										
Jan-89	95.55	0.45	0.33	ND< 0.003	ND< 0.009	ND< 0.5	ND< 0.5	ND< 0.5	ND< 1.0	55
Apr-89	99.67	ND< 0.02	0.06	ND< 0.01	ND< 0.02	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	24
Jul-89	98.77	ND< 0.05	0.17	ND< 0.01	0.02	ND< 0.7	ND< 1.0	ND< 1.0	ND< 1.0	57
Oct-89	95.62	2.5	1.8	ND< 0.01	ND< 0.05	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	110
Jan-90	96.44	2.28	2.2	ND< 0.01	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	100
Apr-90	98.26	0.8	0.81	ND< 0.005	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	150
Jul-90	99.78	0.03	0.04	ND< 0.01	ND< 0.02	ND< 2.5	ND< 2.5	ND< 2.5	ND< 5.0	64
Oct-90	98.69	0.25	0.19	ND< 0.005	0.062	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	17
Jan-91	98.04	0.124	0.085	ND< 0.005	ND< 0.02	ND< 0.5	6.6	1.4	9.0	26
Apr-91	100.83	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	26
Jul-91	101.88	ND< 0.02	0.027	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	99.0	ND< 1.0	41
Oct-91	101.30	0.05	0.07	ND< 0.005	ND< 0.01	ND< 0.5	ND< 1.0	94.0	ND< 1.0	120
Jan-92	103.62	ND< 0.05	ND< 0.0081	ND< 0.0027	0.031	ND< 1	ND< 1.0	1220.0	92.0	45
Apr-92	106.27	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.05	2800.0	3600.0	6190.0	52
Jul-92	106.93	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.05	34000.0	7900.0	24000	N D 1000
Oct-92	104.3	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1000	83000.0	13000	58000	N D 1000
Jan-93	107.56	ND< 0.02	0.057	ND< 0.005	0.053	ND< 50	400.0	3900.0	5300.0	ND< 100
Apr-93	115.26	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	5100.0	4000.0	9200.0	110
Jul-93	115.81	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 16	ND< 33.0	160.0	74.0	1100
Oct-93	115.79	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	120.0	45.0	390
Jan-94	115.76	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	48.0	290.0	220.0	230
Apr-94	116.51	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 500	17000.0	12000	32000	270
Jul-94	117.03	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1000	56000.0	15000	40000	200
Oct-94	111.17	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 500	57000.0	11000	34000	350
Jan-95	112.25	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 250	8200.0	9800.0	2000.0	310
Apr-95	117.92	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	ND< 100.0	650.0	480.0	670
Jul-95	119.31	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	69.0	780.0	340.0	540
Oct-95	115.67	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 25	110.0	670.0	1900.0	320
Jan-96	113.73	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	100.0	4300.0	6100.0	500
Apr-96	117.00	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	3.3	5.5	24.0	22.0	580
Jul-96	116.49	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	4.6	ND< 2.0	42.0	4.3	570
Oct-96	112.73	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	ND< 100.0	2900.0	350.0	470
Jan-97	114.46	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	ND< 5.0	ND< 5.0	400
Apr-97	117.29	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	ND< 10.0	18.0	ND< 10.0	770
Jul-97	117.34	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 25	ND< 50.0	2500.0	860.0	850
Oct-97	113.75	ND< 0.02	0.048	ND< 0.005	ND< 0.02	ND< 25	150.0	1900.0	4800.0	ND< 50
Jan-98	112.06	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	ND< 10.0	690.0	260.0	270
Apr-98	117.07	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	ND< 10.0	23.0	ND< 10.0	390
Jul-98	118.26	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 12	ND< 25.0	73.0	ND< 25.0	1300
Oct-98	115.49	3.3	1.3	0.0075	0.34	7.4	ND< 12.0	390.0	ND< 12.0	1200
Jan-99	112.68	3.3	2.4	ND< 0.005	ND< 0.02	ND< 6.2	ND< 12.0	100.0	83.0	550
Apr-99	112.77	ND< 0.01	0.64	ND< 0.005	ND< 0.025	ND< 5.0	ND< 5.0	ND< 5.0	ND< 5.0	350
Jul-99	112.57	5.8	5.6	ND < 0.010	ND < 0.050	ND <25	ND <25	ND <25	ND <25	810

TABLE 6-1
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE AROMATICS				HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)
MW - 11										
Jan-89	95.97	ND< 0.01	ND< 0.014	ND< 0.003	ND< 0.009	ND< 0.5	ND< 0.5	43.0	1.5	34
Apr-89	99.85	ND< 0.02	0.04	ND< 0.01	ND< 0.02	ND< 500	7500.0	2600.0	11000	39
Jul-89	98.95	ND< 0.05	ND< 0.02	ND< 0.01	0.13	ND< 7	ND< 10.0	ND< 10.0	90.0	29
Oct-89	95.77	ND< 0.05	ND< 0.02	ND< 0.01	ND< 0.05	ND< 5	ND< 10.0	200.0	ND< 10.0	35
Jan-90	96.72	ND< 0.02	ND< 0.01	ND< 0.01	ND< 0.02	ND< 5	ND< 5.0	83.0	ND< 10.0	46
Apr-90	98.44	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	2.6	370.0	150.0	33
Jul-90	100.00	ND< 0.02	ND< 0.01	ND< 0.01	0.03	ND< 25	440.0	1000.0	760.0	65
Oct-90	98.97	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	15000.0	3000.0	10000	ND< 1
Jan-91	98.29	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	15000.0	4700.0	12000	ND< 1
Apr-91	101.17	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	8500.0	3300.0	7500.0	63
Jul-91	102.19	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	57.0	520.0	220.0	61
Oct-91	101.61	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.01	ND< 0.5	140.0	2000.0	660.0	110
Jan-92	104.09	0.10	ND< 0.0081	ND< 0.0027	0.02	ND< 1	7.3	230.0	26.0	85
Apr-92	106.61	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.01	ND< 0.05	1.7	130.0	2.3	70
Jul-92	107.12	ND< 0.02	0.02	ND< 0.005	0.09	ND< 0.05	ND< 0.1	17.0	ND< 0.1	160
Oct-92	104.55	ND< 0.02	0.011	ND< 0.005	ND< 0.01	ND< 0.05	ND< 0.1	11.0	ND< 0.1	160
Jan-93	108.27	ND< 0.02	0.013	ND< 0.005	0.088	ND< 1.2	ND< 2.5	110.0	ND< 2.5	86
Apr-93	115.6	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.05	ND< 1.0	2.0	ND< 1.0	59
Jul-93	116.07	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.05	2.5	1.8	6.4	230
Oct-93	116.01	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	2.1	3.1	150
Jan-94	116.03	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	2.5	2.8	190
Apr-94	116.83	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	80
Jul-94	117.23	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	1.6	180
Oct-94	111.30	ND< 0.02	0.011	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	4.5	ND< 1.0	360
Jan-95	112.53	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	660.0	850.0	1100.0	660
Apr-95	118.26	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	ND< 100.0	1900.0	1000.0	74
Jul-95	119.51	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	160.0	37.0	140
Oct-95	115.80	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	5.8	2.2	180
Jan-96	113.98	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 25	520.0	460.0	1000.0	620
Apr-96	117.37	ND< 0.02	ND< 0.01	ND< 0.005	0.023	ND< 25	160.0	1100.0	1400.0	240
Jul-96	116.75	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	ND< 20.0	460.0	290.0	220
Oct-96	112.95	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.9	20.0	8.0	250
Jan-97	114.78	ND< 0.02	ND< 0.01	ND< 0.005	0.029	ND< 0.5	9.4	84.0	88.0	160
Apr-97	117.60	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	120.0	8.2	370
Jul-97	117.61	ND< 0.02	ND< 0.01	ND< 0.005	0.15	ND< 2.5	ND< 5.0	8.3	ND< 5.0	240
Oct-97	114.02	ND< 0.02	ND< 0.01	ND< 0.005	0.1	ND< 2.5	ND< 5.0	ND< 5.0	ND< 5.0	350
Jan-98	112.23	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 12	770.0	1800.0	2200.0	390
Apr-98	117.36	ND< 0.02	ND< 0.01	ND< 0.005	0.077	ND< 1.2	63.0	150.0	210.0	180
Jul-98	118.57	ND< 0.02	ND< 0.01	ND< 0.005	0.077	ND< 1.2	ND< 2.5	41.0	4.8	150
Oct-98	115.91	ND< 0.02	ND< 0.01	ND< 0.005	0.041	ND< 5	ND< 10.0	ND< 10.0	ND< 10.0	430
Jan-99	113.05	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 6.2	260.0	750.0	970.0	690
Apr-99	113.14	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.025	ND< 25	670	1600	1270	480
Jul-99	113.67	ND < 0.020	ND < 0.010	ND < 0.0050	ND < 0.025	ND <10	ND <10	85	ND <10	740

TABLE 6-1
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE AROMATICS				HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)
MW - 14S										
Oct-90	98.07	3.2	2.2	0.018	5.3	ND< 0.5	ND< 1.0	1750.0	ND< 1.0	180
Jan-91	97.38	0.4	0.94	0.007	1	ND< 0.5	ND< 1.0	2800.0	5900.0	108
Apr-91	99.26	0.39	0.41	0.005	0.15	ND< 0.5	ND< 1.0	4100.0	ND< 1.0	84
Jul-91	101.27	0.02	0.31	0.005	0.11	ND< 0.5	ND< 1.0	31.0	ND< 1.0	55
Oct-91	100.66	0.13	0.23	ND< 0.005	0.05	ND< 0.5	ND< 1.0	680.0	ND< 1.0	81
Jan-92	103.08	0.27	0.15	ND< 0.0027	0.093	ND< 1	ND< 1.0	ND< 1.0	ND< 1.0	59
Apr-92	105.70	0.13	0.16	ND< 0.005	0.04	ND< 0.5	ND< 0.5	ND< 0.5	ND< 0.5	56
Jul-92	106.38	0.1	0.33	ND< 0.005	0.56	0.6	ND< 1.0	ND< 1.0	ND< 1.0	44
Oct-92	103.72	0.16	0.54	ND< 0.005	0.72	ND< 1	ND< 1.0	ND< 1.0	ND< 1.0	71
Jan-93	107.00	0.056	0.24	ND< 0.005	0.33	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	56
Apr-93	114.80	ND< 0.02	0.018	ND< 0.005	0.032	ND< 0.5	24.0	40.0	55.0	18
Jul-93	115.36	ND< 0.02	0.20	ND< 0.005	0.023	ND< 0.5	1.3	1.2	3.8	25
Oct-93	115.42	ND< 0.02	0.01	ND< 0.005	0.021	ND< 0.5	ND< 1.0	2.1	3.7	25
Jan-94	115.28	ND< 0.02	0.015	ND< 0.005	0.022	ND< 0.5	ND< 1.0	3.2	1.4	21
Apr-94	116.06	ND< 0.02	0.022	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	29
Jul-94	116.64	ND< 0.02	0.016	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	15
Oct-94	110.70	0.035	0.064	ND< 0.005	ND< 0.020	0.53	ND< 1.0	ND< 1.0	ND< 1.0	58
Feb-95	113.10	ND< 0.02	0.016	ND< 0.005	0.020	ND< 50	ND< 100.0	3000.0	690.0	50
Apr-95	117.50	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.020	ND< 5	76.0	120.0	190.0	20
Jul-95	118.93	ND< 0.02	ND< 0.01	0.0055	ND< 0.020	ND< 0.5	2.8	26.0	12.0	22
Oct-95	115.25	0.022	0.046	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	2.1	2.0	35
Jan-96	113.13	ND< 0.02	0.034	ND< 0.005	0.024	ND< 1	4.7	87.0	58.0	42
Apr-96	116.52	0.021	0.028	ND< 0.005	ND< 0.020	ND< 2.5	54.0	120.0	110.0	51
Jul-96	116.04	ND< 0.01	0.069	ND< 0.005	ND< 0.020	0.58	ND< 1.0	20.0	10.0	37
Oct-96	112.22	0.052	0.082	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	13.0	2.9	61
Jan-97	113.85	0.024	0.031	ND< 0.005	ND< 0.020	ND< 2.5	ND< 5.0	470.0	ND< 5.0	90
Apr-97	116.82	ND< 0.02	0.032	0.0053	ND< 0.020	0.58	2.9	91.0	36.0	45
Jul-97	117.21	ND< 0.02	0.016	ND< 0.005	ND< 0.020	ND< 5	ND< 1.0	14.0	1.0	35
Oct-97	113.39	0.1	0.013	ND< 0.005	ND< 0.020	ND< 0.5	ND< 1.0	20.0	1.8	57
Jan-98	111.43	* N D/0.0103	0.018	ND< 0.005	0.020	ND< 0.5	1.1	19.0	5.0	50
Apr-98	116.47	ND< 0.02	0.018	ND< 0.005	0.023	ND< 12	ND< 25.0	1500.0	150.0	38
Jul-98	117.79	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.020	0.51	ND< 1.0	18.0	8.4	18
Oct-98	115.19	0.032	0.044	ND< 0.005	0.027	ND< 1.2	ND< 2.5	120.0	29.0	62
Jan-99	112.31	0.058	0.032	ND< 0.005	ND< 0.020	1.1	ND< 2.0	77.0	64.0	98
Apr-99	112.21	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.025	ND< 12	ND< 12	820	47	84
Jul-99	112.19	ND < 0.020	0.038	ND < 0.0050	0.037	ND <50	ND <50	3,000	ND <50	74

* ND/10.3 = EPA method 7196/EPA Method 218.6 (Sample was analyzed for hexavalent chromium by two methods.)

TABLE 6-1
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS								PURGEABLE AROMATICS								HALOCARBONS
		Hexavalent Chromium (mg/L)		Total Chromium (mg/L)		Cadmium (mg/L)		Copper (mg/L)		Benzene (ug/L)		Toluene (ug/L)		Ethyl-Benzene (ug/L)		Total Xylenes (ug/L)		Trichloroethene (ug/L)
MW - 15S																		
Oct-90	97.71	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	21
Jan-91	97.10	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		4.0		1.6		4.0	13
Apr-91	99.71	ND<	0.02	ND<	0.01		0.011	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	28
Jul-91	100.94	ND<	0.02	ND<	0.01		0.014	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	17
Oct-91	100.35	ND<	0.02		0.01		0.02		0.06	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	13
Jan-92	102.72	ND<	0.051	ND<	0.0081		0.008		0.01	ND<	1	ND<	1.0	ND<	1.0	ND<	1.0	15
Apr-92	105.29	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.01	ND<	0.5	ND<	0.5	ND<	0.5	ND<	0.5	4.1
Jul-92	105.95	ND<	0.02		0.04		0.005		0.27	ND<	0.5	ND<	0.5	ND<	0.5	ND<	0.5	2.9
Oct-92	103.37	ND<	0.02	ND<	0.02		0.0073		0.047	ND<	0.5	ND<	0.5	ND<	0.5	ND<	0.5	N D 1
Jan-93	106.58	ND<	0.02		0.014		0.0085		0.1	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	9.0
Apr-93	114.41	ND<	0.02		0.013	ND<	0.005	ND<	0.02	ND<	0.5		14.0		10.0		22.0	4.6
Jul-93	115.01	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		1.2	ND<	1.0		2.4	2.4
Oct-93	115.07	ND<	0.04	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	3.2
Jan-94	114.90	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	1.9
Apr-94	115.72	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	3.1
Jul-94	116.31	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	2.1
Oct-94	110.42	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0	ND<	1.0	ND<	1.0	6.0
Jan-95	111.14		0.048		0.044	ND<	0.005	ND<	0.02	ND<	1		4.0		64.0		27.0	3.7
Apr-95	117.15	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	2.5		60.0		82.0		130.0	2.8
Jul-95	118.61	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5		2.5		18.0		12.0	5.2
Oct-95	114.45	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		1.0	ND<	1.0	3.9
Jan-96	112.69	ND<	0.02		0.012	ND<	0.005	ND<	0.02	ND<	0.5		1.8		25.0		22.0	3.8
Apr-96	116.09	ND<	0.02		0.015	ND<	0.005	ND<	0.02	ND<	0.5		13.0		40.0		45.0	2.8
Jul-96	115.69	ND<	0.01		0.014	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		9.7		5.4	3.2
Oct-96	111.81	ND<	0.01	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		2.9		2.6	5.3
Jan-97	113.42	ND<	0.02		0.01	ND<	0.005	ND<	0.02	ND<	0.5		5.5		69.0		1.0	5.1
Apr-97	116.35	ND<	0.02		0.01	ND<	0.005	ND<	0.02	ND<	0.5		9.3		21.0		8.5	3.3
Jul-97	116.60	ND<	0.02		0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		8.2		1.3	4.1
Oct-97	113.08	ND<	0.02		0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		17.0		1.7	5.2
Jan-98	111.06	* N D/0.0177			0.021	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		12.0		3.7	5.0
Apr-98	116.05	ND<	0.02	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		60.0		7.2	3.1
Jul-98	117.47	ND<	0.02		0.014	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		10.0		2.9	3.4
Oct-98	114.87	ND<	0.02		0.017	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		45.0		12.0	3.9
Jan-99	111.98		0.024	ND<	0.01	ND<	0.005	ND<	0.02	ND<	0.5	ND<	1.0		19.0		2.2	7.0
Apr-99	111.85	ND<	0.01		0.013	ND<	0.005	ND<	0.025	ND<	1.0	ND<	1.0		23		2.2	4.2
Jul-99	111.89	ND < 0.020			0.010	ND < 0.0050		ND < 0.025		ND <1.0		ND <1.0			29		23	3.9

* ND/0.0177 = EPA method 7196/EPA Method 218.6 (Sample was analyzed for hexavalent chromium by two methods.)

TABLE 6-1
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring
Historical Results

Monitor Well No. / Date	Groundwater Elevation (Feet MSL)	METALS				PURGEABLE AROMATICS				HALOCARBONS
		Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-Benzene (ug/L)	Total Xylenes (ug/L)	Trichloroethene (ug/L)
MW - 16										
Apr-92	105.99	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.01	ND< 0.5	0.7	1.0	1.6	52
Jul-92	106.7	ND< 0.02	0.03	ND< 0.02	0.35	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	35
Oct-92	104.07	ND< 0.02	0.011	ND< 0.005	0.15	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	72
Jan-93	107.3	ND< 0.02	ND< 0.01	ND< 0.005	0.44	ND< 1.2	ND< 2.5	ND< 2.5	ND< 2.5	51
Apr-93	114.9	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 25	55.0	2300.0	1200.0	42
Jul-93	115.54	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 50	ND< 100.0	3100.0	2000.0	15
Oct-93	115.51	ND< 0.04	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5.0	ND< 10.0	340.0	ND< 10.0	24
Jan-94	115.46	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.02	ND< 20.0	1000.0	ND< 20.0	22
Apr-94	116.25	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	ND< 20.0	820.0	ND< 20.0	37
Jul-94	116.78	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 25	ND< 50.0	1300.0	730.0	76
Oct-94	111.02	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	1.5	2.4	9.7	91
Jan-95	112.08	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	ND< 1.0	ND< 1.0	17
Apr-95	117.60	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	16.0	36.0	55.0	34
Jul-95	118.99	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 10	ND< 20.0	* 540/370	ND< 20.0	67
Oct-95	115.45	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	1.8	1.3	60
Jan-96	113.49	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	11.0	9.7	26
Apr-96	116.72	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	9.8	30.0	33.0	36
Jul-96	116.24	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	6.6	3.6	110
Oct-96	112.59	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.02	ND< 5	49.0	130.0	230.0	73
Jan-97	114.18	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1	4.6	23.0	ND< 2.0	32
Apr-97	117.01	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1	ND< 2.0	7.2	2.4	31
Jul-97	117.12	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1.2	ND< 2.5	6.5	ND< 2.5	30
Oct-97	113.66	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	8.2	ND< 5.0	53
Jan-98	111.92	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 0.5	ND< 1.0	12.0	ND< 3.8	29
Apr-98	116.79	ND< 0.02	ND< 0.01	ND< 0.005	0.023	ND< 0.5	ND< 1.0	28.0	2.7	29
Jul-98	118.00	ND< 0.02	ND< 0.01	ND< 0.005	0.031	ND< 0.5	ND< 1.0	6.0	1.8	28
Oct-98	115.42	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 2.5	ND< 5.0	16.0	ND< 5.0	58
Jan-99	112.68	ND< 0.02	ND< 0.01	ND< 0.005	ND< 0.02	ND< 1.0	ND< 2.0	11.0	ND< 2.0	36
Apr-99	112.59	ND< 0.01	ND< 0.01	ND< 0.005	ND< 0.025	ND< 2.0	ND< 2.0	6.1	ND< 2.0	39
Jul-99	112.43	ND < 0.020	ND < 0.025	ND < 0.0050	ND < 0.025	ND <2.0	ND <2.0	33	ND <2.0	29

ND = Below detection limit as noted
MSL = Mean Sea Level
* 540/370 = original sample/duplicate sample (both results presented because duplicate result deviation is >20%)

TABLE 6-2
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring Well Sampling
Purgeable Halogenated Organic Analytical Results
(µg/L)

Well Identification	Tetrachloro-ethene (PCE)	Trichloro-ethene (TCE)	1,1-Dichloro-ethene (1,1-DCE)	1,1-Dichloro-ethane (1,1-DCA)	1,2-Dichloro-ethane (1,2-DCA)	Carbon Tetrachloride (CCL4)	Chloroform (CHCL3)	cis-1,2-Dichloro-ethene (cis-1,2-DCE)	trans-1,2-Dichloro-ethene (trans-1,2-DCE)	1,1,1-Trichloro-ethane (1,1,1-TCA)	Methylene Chloride (CH2CL2)
PTI- MW01S	**16**	**9.1**	**1.0**	**1.6**	ND <1.0	ND <1.0	ND <1.0	**5.3**	ND <1.0	ND <1.0	ND <1.0
PTI- MW01D	**24**	**2.7**	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW03	**37**	**43**	**9.0**	**3.6**	ND <1.0	**41**	**30**	ND <1.0	ND <1.0	**1.8**	ND <1.0
PTI- MW04	ND <10	**140**	**36**	**58**	**87**	ND <10	ND <10	**100**	ND <10	ND <10	**38**
PTI- MW04A	**6.3**	**5.2**	ND <1.0	**2.0**	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW06B	**8.1**	**8.2**	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW06D	**16**	**23**	**1.6**	**2.6**	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW07	**14**	**65**	**9.4**	**53**	**16**	ND <1.0	**1.4**	**21**	**2.8**	ND <1.0	ND <1.0
PTI- MW09	ND<25	**810**	**190**	**780**	**140**	ND<25	**440**	**50**	ND<25	ND<25	**1400**
PTI- MW11	**25**	**740**	**69**	**250**	**12**	ND <10	**30**	**28**	ND <10	**17**	ND <10
PTI- MW14S	ND<50	**74**	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50
PTI- MW15S	**6.1**	**3.9**	ND <1.0	ND <1.0	**34**	**2.5**	**4.2**	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW15D	**13**	**9.0**	**1.1**	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW16	**22**	**29**	**13**	**130**	**26**	ND <2.0	ND <2.0	**12**	**3.2**	ND <2.0	ND <2.0
MCL	**5.0**	**5.0**	**6.0**	**5.0**	**0.5**	**0.5**	—		**10**		—
SGV GW	ND-4.8	ND-1.2	ND	ND	ND	ND	—		ND		—

All analyses performed by EPA Method 8260.
ND = Analytical parameter not detected
MW = Monitoring Well
MCL = Maximum Contaminant Limit
SGV GW = Range of concentrations in water supply wells tested in the Santa Fe Springs area during the year 1996.

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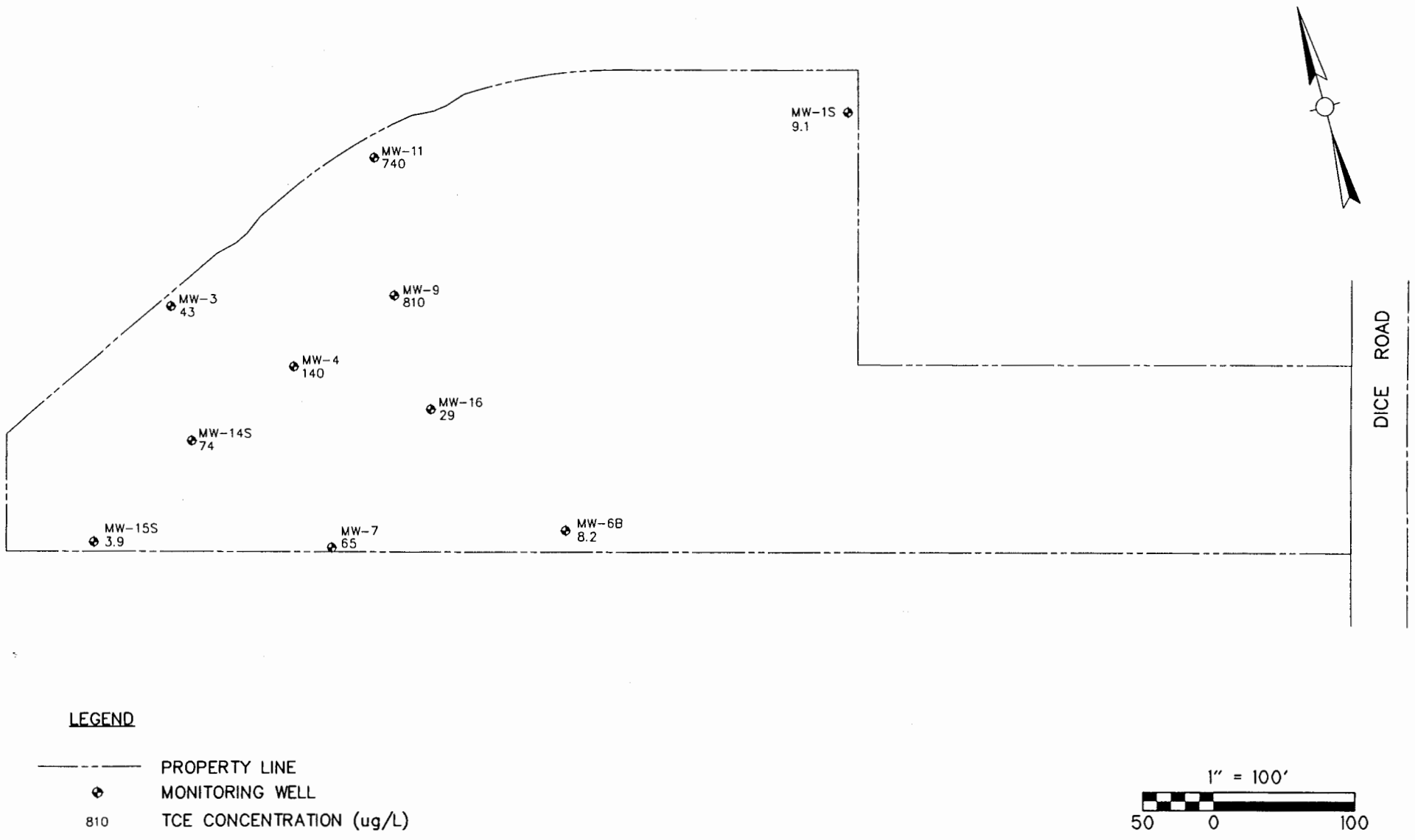

PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

TCE Concentrations - Shallow Wells
July 1999

CDM
environmental engineers, scientists, planners, & management consultants

Figure 6-1

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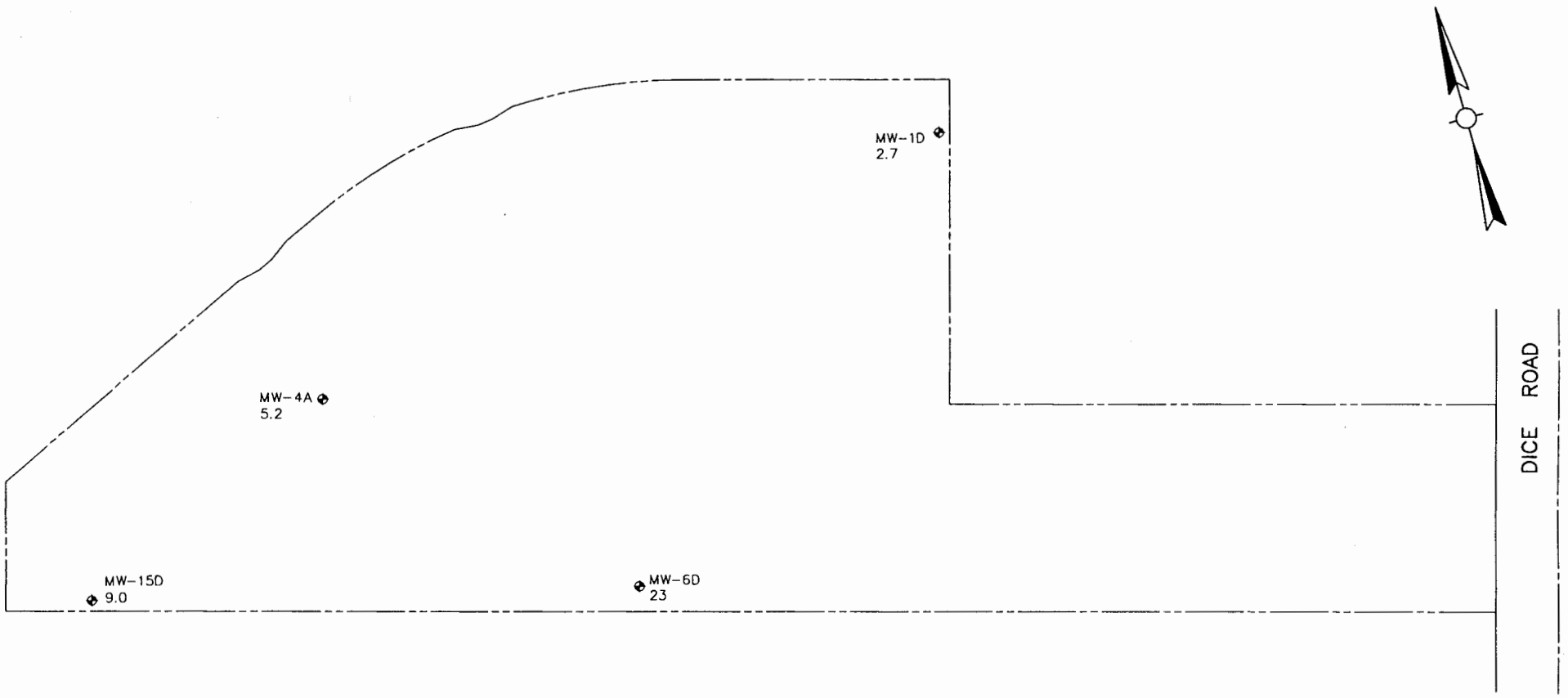

LEGEND

PROPERTY LINE

MONITORING WELL

23 TCE CONCENTRATION (ug/L)

1" = 100'

50 0 100

PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

TCE Concentrations - Deep Wells
July 1999

CDM
environmental engineers, scientists, planners, & management consultants

Figure 6-2

A review of the analytical results contained in Table 6-1 reveals that, with minor exceptions, TCE has historically been detected in all on-site monitoring wells, including the upgradient wells. Past discussions with Department of Health Services (now Cal EPA Department of Toxic Substances Control) and Regional Water Quality Control Board staff indicate that TCE is generally recognized as a regional groundwater contaminant.

Other Halogenated Organics

During the July 1999 sampling, other purgeable halocarbon compounds were detected in most of the on-site wells at concentrations ranging from 1.0 µg/L 1,1-dichloroethene (MW-01S) to 780 µg/L 1,1-dichloroethane (MW-09). The compounds tetrachloroethene; chloroform; 1,2-dichloroethane; carbon tetrachloride; 1,1,1-trichloroethane; methylene chloride; and cis- and trans-1,2-dichloroethene were also detected in several wells. Detections of these other chlorinated organic compounds are assumed to be related to the TCE plume.

6.2 Purgeable Aromatic Organic Compounds

According to PTI personnel, organic chemicals have not historically been used on-site in any of the production processes. Two 10,000 gallon underground storage tanks (diesel and gasoline), however, were located in the approximate center of the facility, due east of the drum wash area. During tank removal operations in July 1989, petroleum hydrocarbon contamination was discovered in the tank excavation. The RFI report indicated that petroleum hydrocarbon contamination was not detected at depths below 30 feet near the former tank locations. Although they have not been used on-site, purgeable aromatic compounds have been historically detected in groundwater underlying the facility. The primary organic compounds of concern are toluene, ethylbenzene and total xylenes, which vary in both concentration and lateral extent. The RFI report indicated that these compounds appeared to be migrating onto the subject property from the property to the north. According to Los Angeles County Department of Public Works files, leaks from tanks containing purgeable aromatic compounds with subsequent groundwater contamination are known to have occurred at the property to the north of PTI.

Purgeable aromatic compound results for July 1999 are presented in Table 6-3. Concentrations of total aromatic compounds for the shallow wells are illustrated on Figure 6-3. Historic sampling results indicate that purgeable aromatic contamination originated off-site to the north and has migrated onto the subject property. During previous sampling events, elevated concentrations of toluene, ethylbenzene and xylenes were detected in MW-11 and MW-3 along the northern perimeter of the property. Since approximately July 1991, elevated concentrations of these compounds have been detected in well MW-04, indicating that the plume may be migrating down gradient. In addition, since January 1992 high concentrations have also been detected in well MW-09.

The results of the July 1999 sampling show that the highest concentrations of total purgeable aromatics (BTEX) were detected in MW-14S (Figure 6-3), which had an ethylbenzene concentration of 3,000 µg/L. The second highest total BTEX concentration was detected in well MW-04, which had a ethylbenzene concentration of 670 µg/L and total xylenes of 67 µg/L.

TABLE 6-3
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring Well Sampling
Purgeable Aromatic Organic Analytical Results
(µg/L)

Well Identification	Benzene	Toluene	Ethylbenzene	Xylenes (Total)
PTI- MW01S	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW01D	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW03	ND <1.0	ND <1.0	**1.3**	ND <1.0
PTI- MW04	ND <10	ND <10	**670**	**67**
PTI- MW04A	ND <1.0	ND <1.0	ND <1.0	ND <1.0
PTI- MW06B	ND <1.0	ND <1.0	**1.2**	ND <1.0
PTI- MW06D	ND <1.0	ND <1.0	**4.4**	ND <1.0
PTI- MW07	ND <1.0	ND <1.0	**1.3**	ND <1.0
PTI- MW09	ND <25	ND <25	ND <25	ND <25
PTI- MW11	ND <10	ND <10	**85**	ND <10
PTI- MW14S	ND <50	ND <50	**3000**	ND <50
PTI- MW15S	ND <1.0	ND <1.0	**29**	**23**
PTI- MW15D	ND <1.0	ND <1.0	**34**	ND <1.0
PTI- MW16	ND <2.0	ND <2.0	**33.0**	ND <2.0
MCL	**1.0**	**150**	**700**	**1,750**
SGV GW	ND	ND	ND	ND

All analyses performed by EPA Method 8260.
ND = Analytical parameter not detected
MW = Monitoring Well
MCL = Maximum Contaminant Limit
SGV GW = Range of concentrations in water supply wells tested in the Santa Fe Springs area during the year 1996.

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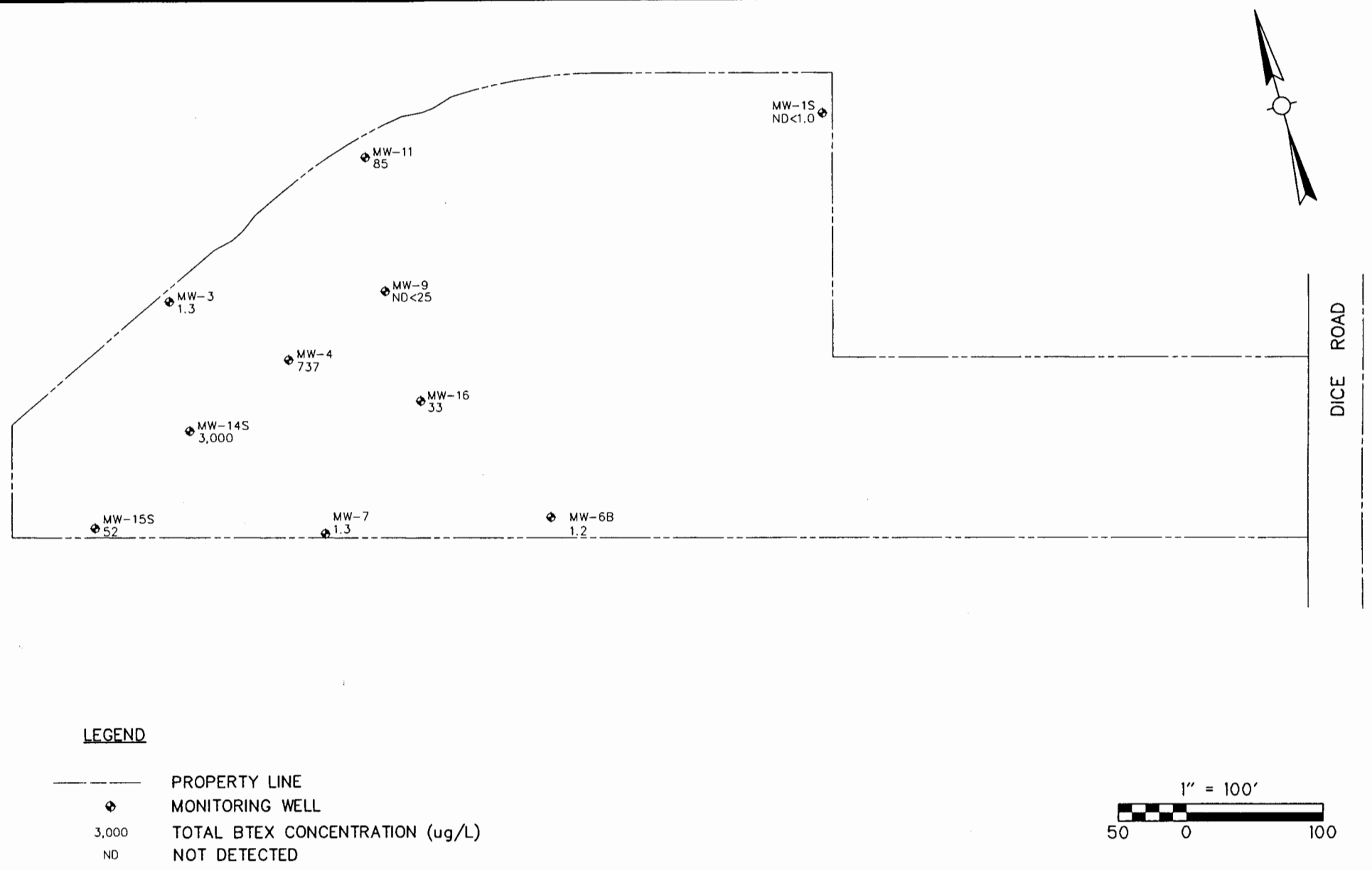

PHIBRO-TECH, INC., SANTA FE SPRINGS, CA

Total BTEX Concentrations - Shallow Wells
July 1999

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Figure 6-3

Benzene

During the July 1999 sampling, benzene was not detected in any of the wells. During the April 1999 sampling event, benzene was detected in only one well (MW-04) at a concentration of 3.5 µg/L. Historical evidence indicates that benzene is not a contaminant of concern for the facility.

Toluene

During the July 1999 sampling event, toluene was not detected in any of the wells. During the April 1999 sampling event, toluene was detected in wells MW-06B, MW-06D, MW-07, and MW-11 at concentrations ranging from 3.0 µg/L to 670 µg/L.

Significant toluene concentrations were detected during July 1990 to July 1991 (MW-11), July 1991 to January 1992 (MW-04), July 1992 to July 1993 (MW-09), and July 1994 to January 1995 (MW-09). Concentrations were also detected at location MW-04 during January 1993. Elevated ethylbenzene and total xylene concentrations are generally associated with elevated toluene concentrations.

Ethylbenzene

During the July 1999 sampling round, ethylbenzene was detected in 10 of the 14 wells. Twelve wells had detections in the April 1999 sampling, six of which increased in the July 1999 sampling. Well MW-14S had the highest concentration of 3,000 µg/L, a significant increase from 820 µg/L reported in April 1999. Well MW-04 had the second highest concentration of 670 µg/L, an increase from 220 µg/L detected in April 1999. Well MW-11 had the third highest concentration of 85 µg/L, a decrease from 1,600 µg/L detected in April 1999. The remaining wells with ethylbenzene detections had relatively low concentrations, ranging from 1.2 µg/L in MW-06B to 34 µg/L in MW-15D. Only wells MW-01S, MW-01D, and MW-09 showed no detection of ethylbenzene in July 1999.

Total Xylenes

During the July 1999 sampling round, total xylenes were detected in 2 of the 14 wells, both of which increased in the July 1999 sampling. Nine wells had detections in the April 1999 sampling. Well MW-04 had a total xylenes concentration of 67 µg/L, an increase from 9.9 µg/L in April 1999. Well MW-15S had a concentration of 23 µg/L, an increase from 2.2 µg/L in April 1999.

6.3 Inorganic and Miscellaneous Parameters

Table 6-4 shows the analytical results for inorganic parameters (cadmium, total and hexavalent chromium, copper, and pH) during the July 1999 sampling event.

Hexavalent Chromium (Cr^{+6})

During the July 1999 sampling, hexavalent chromium was detected in two wells. MW-04 had a concentration of 41.1 mg/L, which is a increase from 4.6 mg/L in April 1999. MW-09 had a concentration of 5.8 mg/L during the July 1999 sampling, however, hexavalent chromium was not detected in April 1999. Figure 6-4 shows the concentration of hexavalent chromium detected in the shallow wells during the July 1999 sampling.

The water purged from MW-04 has typically been bright yellow in color since CDM began sampling the wells on a quarterly basis in January 1989. During the July 1999 sampling round, the color of water from MW-04 was again noted as yellow. The color of the water from MW-09 has periodically been noted as yellow, including during the April sampling event. However, the water from MW-09 was clear during the July 1999 sampling. Figure 6-5 shows the concentrations of hexavalent chromium and groundwater elevations in MW-04 over time.

The concentrations of hexavalent chromium at MW-04 decreased from July 1989 (120 mg/L) to July 1993 (1.8 mg/L), while groundwater elevations increased. Since July 1993, hexavalent chromium concentrations have fluctuated up and down while groundwater elevations have remained fairly constant. Historically, hexavalent chromium has been detected in two wells other than MW-04, although the highest concentration has always been detected at MW-04. At MW-14S from October 1990 to January 1993, hexavalent chromium concentrations generally decreased, with analytical non-detections reported for the last six sampling rounds previous to October 1994 and eight of the last 14 sampling rounds since then. In MW-09, hexavalent chromium concentrations decreased between October 1989 and January 1991 and except for a trace amount detected in October 1991, hexavalent chromium concentrations have been below detection limits until the January 1999 sampling event. A trace level of hexavalent chromium was detected in MW-15S for the first time during the January 1995 sampling event and was detected again in January 1999.

Total Chromium (Cr[T])

Total chromium was detected above the detection limit in four monitoring wells during the July 1999 sampling event. The highest concentration was detected in well MW-04 at a concentration of 49.7 mg/L, which is an increase from 42.8 mg/L in April 1999. The remaining wells with total chromium detections had concentrations ranging from 0.010 mg/L in MW-15S to 5.6 mg/L in MW-09. Figure 6-6 shows the concentrations of total chromium detected in shallow monitoring wells during July 1999. Figure 6-7 shows the concentrations of total chromium and corresponding groundwater elevations in MW-04 over time.

TABLE 6-4
PHIBRO-TECH, INC.
July 1999 Quarterly Monitoring Well Sampling
Inorganic Analytical Results
(mg/L)

Well Identification	Cadmium	Chromium (Hexavalent)	Chromium (Total)	Copper	pH
	EPA- 6010B	EPA- 7196A	EPA- 6010B	EPA- 6010B	EPA- 150.1
PTI- MW01S	ND < 0.0050	ND < 0.020	ND < 0.010	**0.052**	**7.0**
PTI- MW01D	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	**7.6**
PTI- MW03	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	**7.3**
PTI- MW04	**0.42**	**41.1**	**49.7**	ND < 0.050	**6.9**
PTI- MW04A	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	**7.6**
PTI- MW06B	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	**7.4**
PTI- MW06D	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	**7.5**
PTI- MW07	ND<0.010	ND < 0.020	ND < 0.020	**0.068**	**7.0**
PTI- MW09	ND < 0.010	**5.8**	**5.6**	ND < 0.050	**6.6**
PTI- MW11	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	**6.9**
PTI- MW14S	ND < 0.0050	ND < 0.020	**0.038**	**0.037**	**7.4**
PTI- MW15S	ND < 0.0050	ND < 0.020	**0.010**	ND < 0.025	**7.6**
PTI- MW15D	ND < 0.0050	ND < 0.020	ND < 0.010	ND < 0.025	**7.5**
PTI- MW16	ND < 0.0050	ND < 0.020	ND<0.010	ND < 0.025	**7.0**
MCL	0.005	—	0.05	1	—
SGV GW	ND	ND	ND	0.052	8.77

ND = Analytical parameter not detected.
NA = Parameter not analyzed
MW = Monitoring Well
MCL = Maximum Contaminant Limit
SGV GW = Range of concentrations in water supply wells tested in the Santa Fe Springs area in the year 1996.

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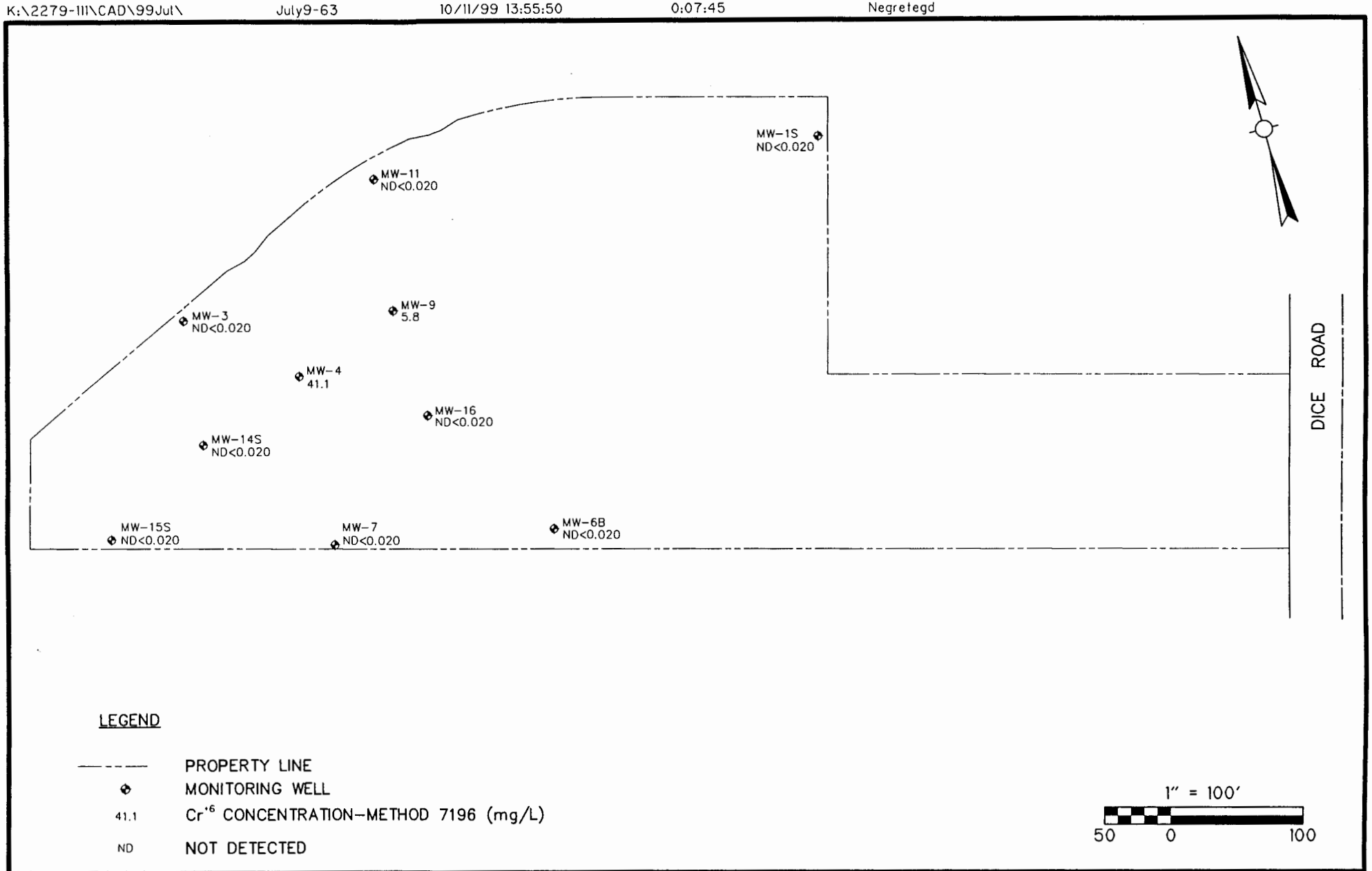

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Hexavalent Chromium Concentrations - Shallow Wells
July 1999

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Figure 6-4

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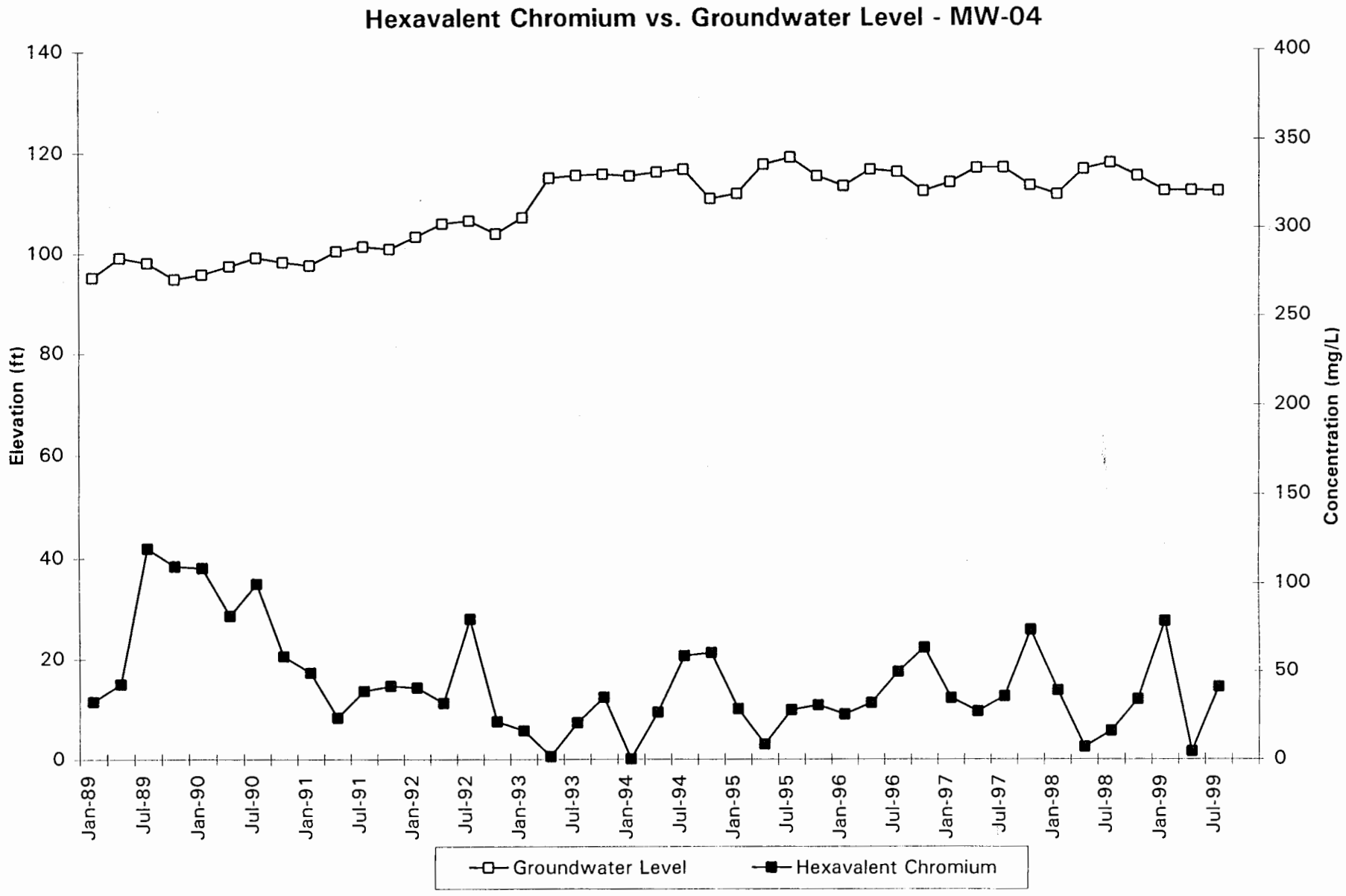

PHIBRO-TECH, INC., SANTA FE SPRINGS, CA.

Hexavalent Chromium Concentrations - Groundwater Elevations
MW-04
January1989 - July 1999

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Figure 6-5

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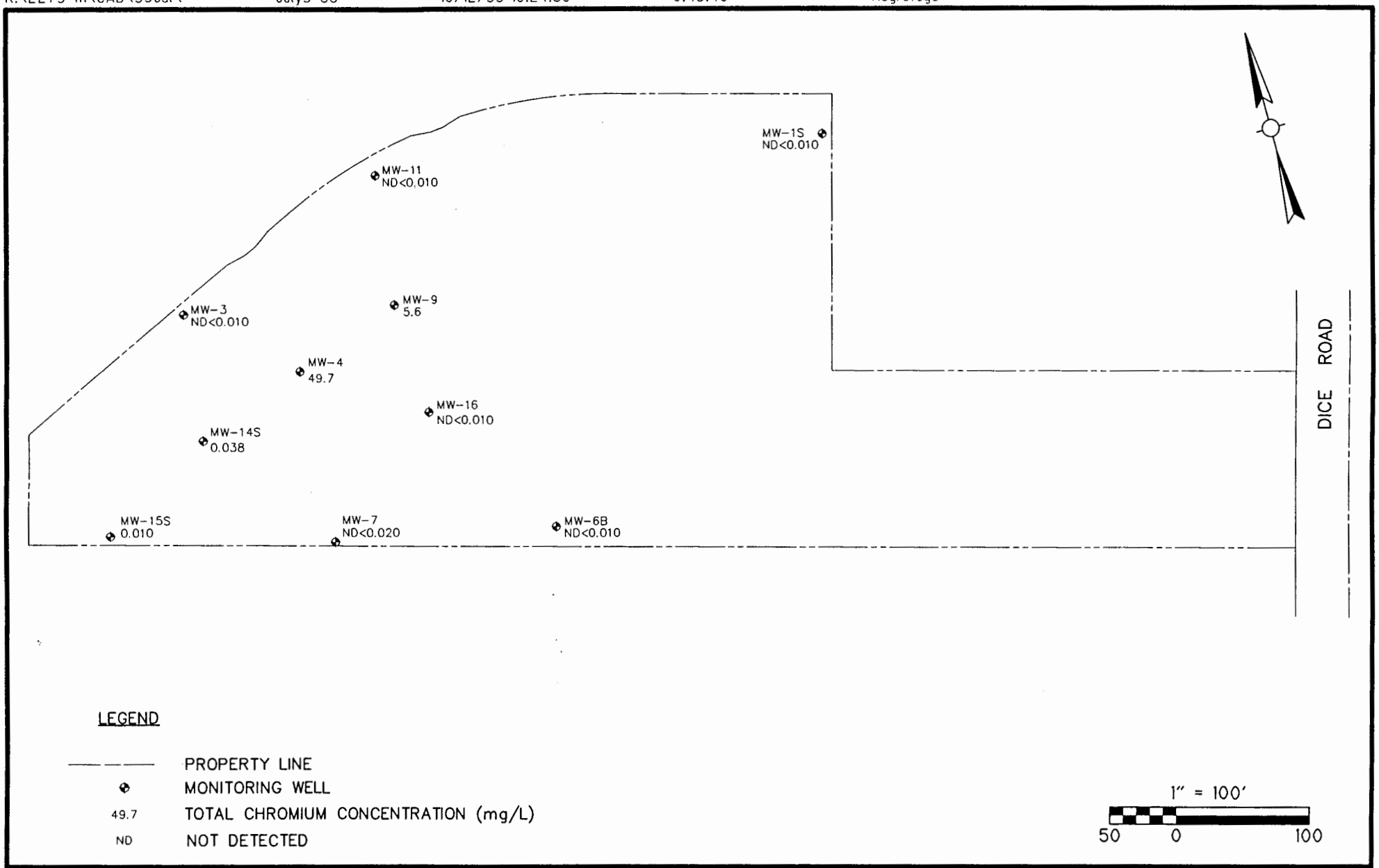

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Total Chromium Concentrations - Shallow Wells
July 1999

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Figure 6-6

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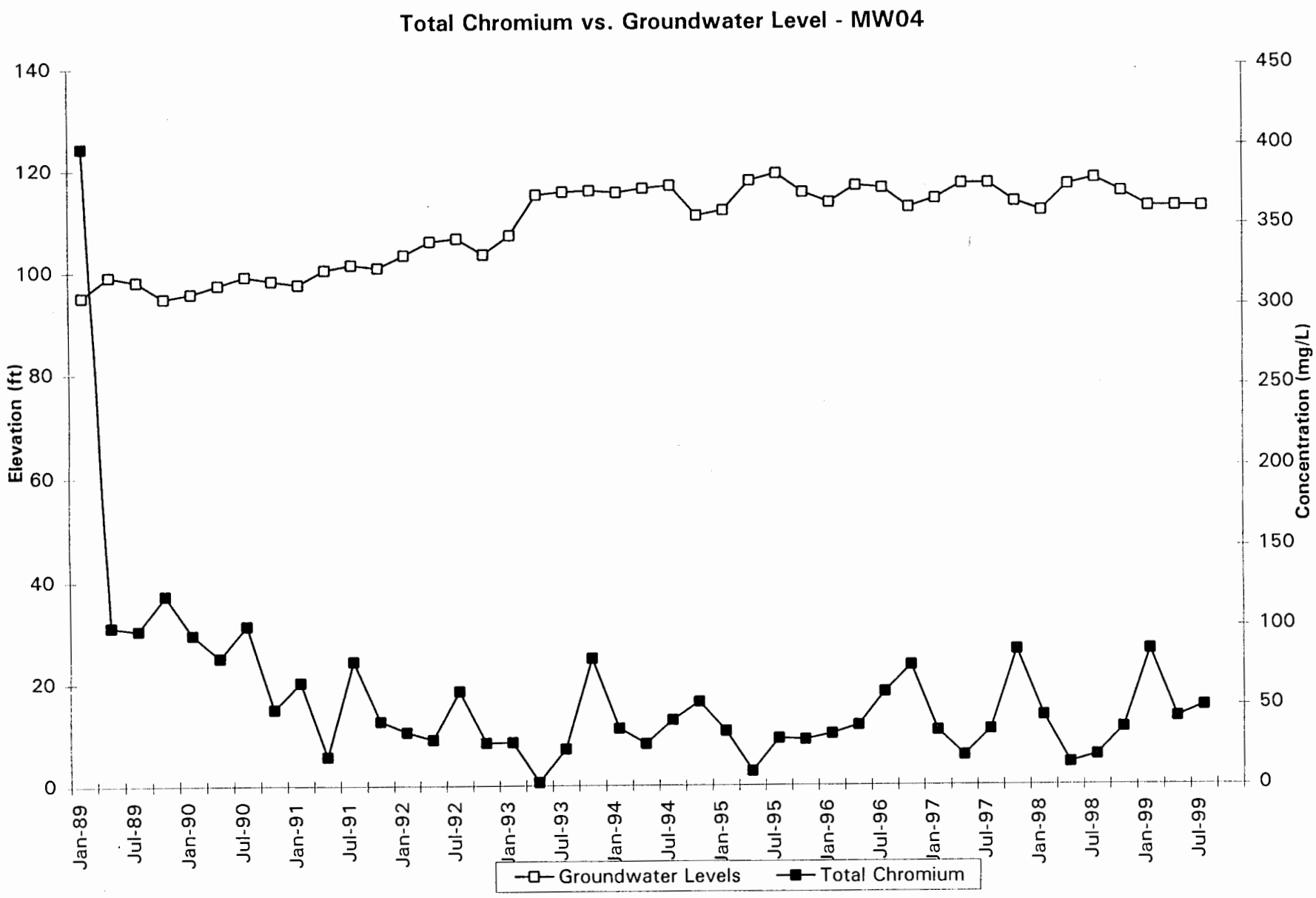

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Total Chromium Concentrations - Groundwater Elevations
MW-04
January 1989 - July 1999

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Figure 6-7

Comparison of historical total chromium data with present data (Table 6-1) indicates that total chromium concentrations, like those of hexavalent chromium, generally decreased from January 1989 to July 1993, and have fluctuated up and down since July 1993. Historically, the highest total chromium concentrations have been detected in MW-04. Sporadic detections of total chromium close to the detection limit have occurred historically in nearly all shallow wells on site.

Cadmium (Cd)

During the July 1999 sampling event, cadmium was detected in one on-site well at a concentration greater than the MCL of 0.005. Well MW-04 had a concentration of 0.42 mg/L, a slight increase from 0.41 mg/L in April 1999.

Previous concentrations in MW-04 have ranged from 0.028 mg/L in January 1989 to 0.86 mg/L in July 1992. Figure 6-8 shows the cadmium concentrations detected in the on-site wells during July 1999. Figure 6-9 shows the concentrations in MW-04of cadmium and corresponding groundwater elevations in MW-04 over time. As groundwater elevations have generally increased since January 1989, cadmium concentrations have also generally increased. As shown on the figure, cadmium concentrations have fluctuated considerably (i.e., from non-detectable at a detection limit of 0.005 mg/L during July 1993 to 0.86 mg/L during July 1992) since July 1990. Cadmium concentrations in MW-04 declined from October 1997 until the October 1998 sampling event when the concentration increased again.

Cadmium has been detected historically only in well MW-04, with the exceptions of 0.01 mg/L in MW-01 during July 1989, 0.005 to 0.018 mg/L in MW-14S during October 1990 through July 1991, 0.0055 mg/L in MW-14S during July 1995, and in MW-15S at low concentrations close to the detection limit from July 1991 to January 1993. Detected concentrations in MW-15S have ranged from 0.005 mg/L in July 1992 to 0.02 mg/L during October 1991.

Copper (Cu)

Copper was detected in three wells (MW-01S, MW-07, and MW-14S), an increase from one well in April 1999. None of the wells had copper concentrations above the MCL of 1.0 mg/L. The highest concentration was in well MW-07 at 0.068 mg/L, which was an increase from 0.068 mg/L in April 1999. Figure 6-10 shows the copper concentrations detected in the on-site wells during July 1999. Historically, with the exception of well MW-14S, elevated concentrations of copper above the MCL have not been detected in on-site monitoring wells.

pH

Groundwater samples from all wells were measured for pH in the field during purging activities and also by the analytical laboratory on the samples submitted for analysis. Field pH measurements were recorded in the field log book during well purging. In July 1999, the field measurements of pH generally correlated with the values shown in Table 6-4, which range from 6.6 to 7.6.

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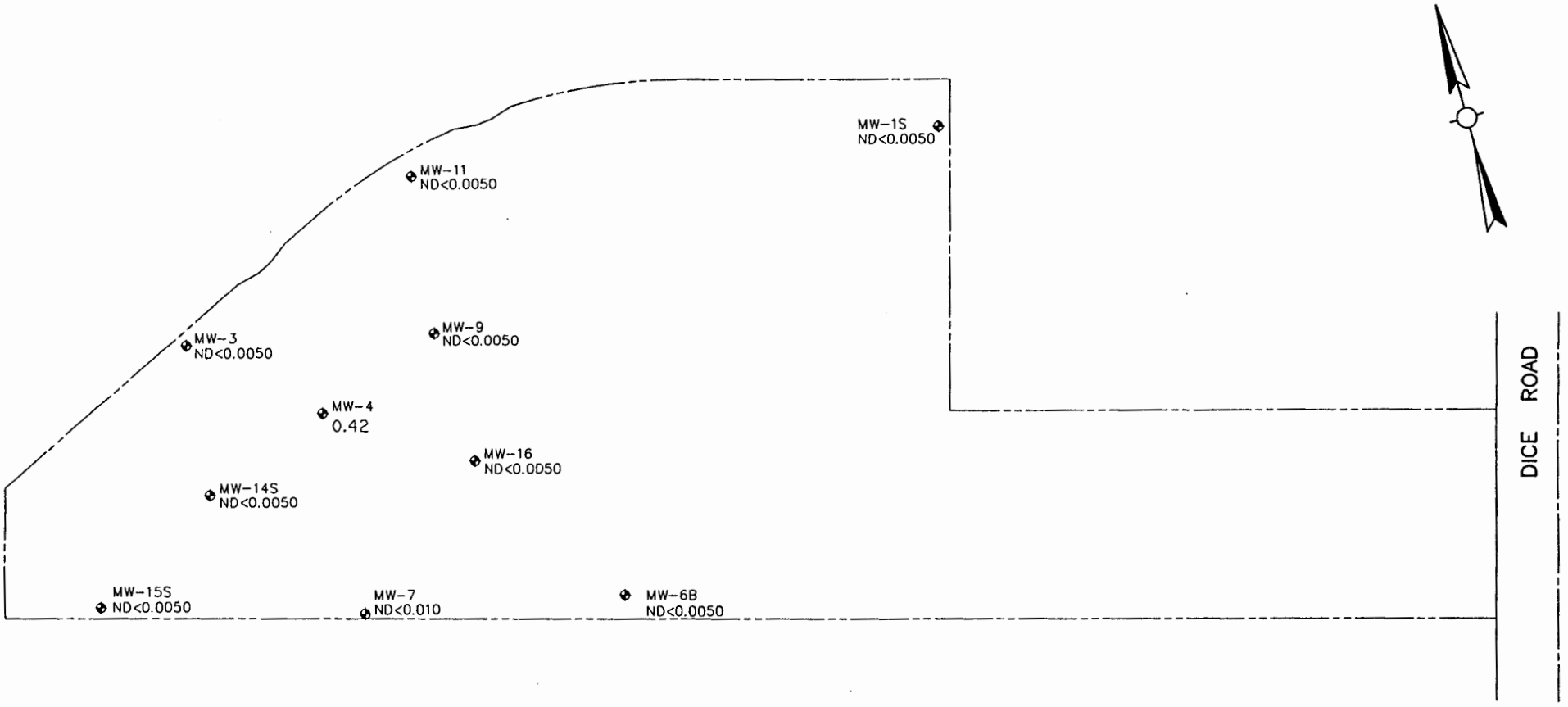

LEGEND

———	PROPERTY LINE
◆	MONITORING WELL
0.42	CADMIUM CONCENTRATION (mg/L)
ND	NOT DETECTED

1" = 100'

50 0 100

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Cadmium Concentrations - Shallow Wells
July 1999

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Figure 6-8

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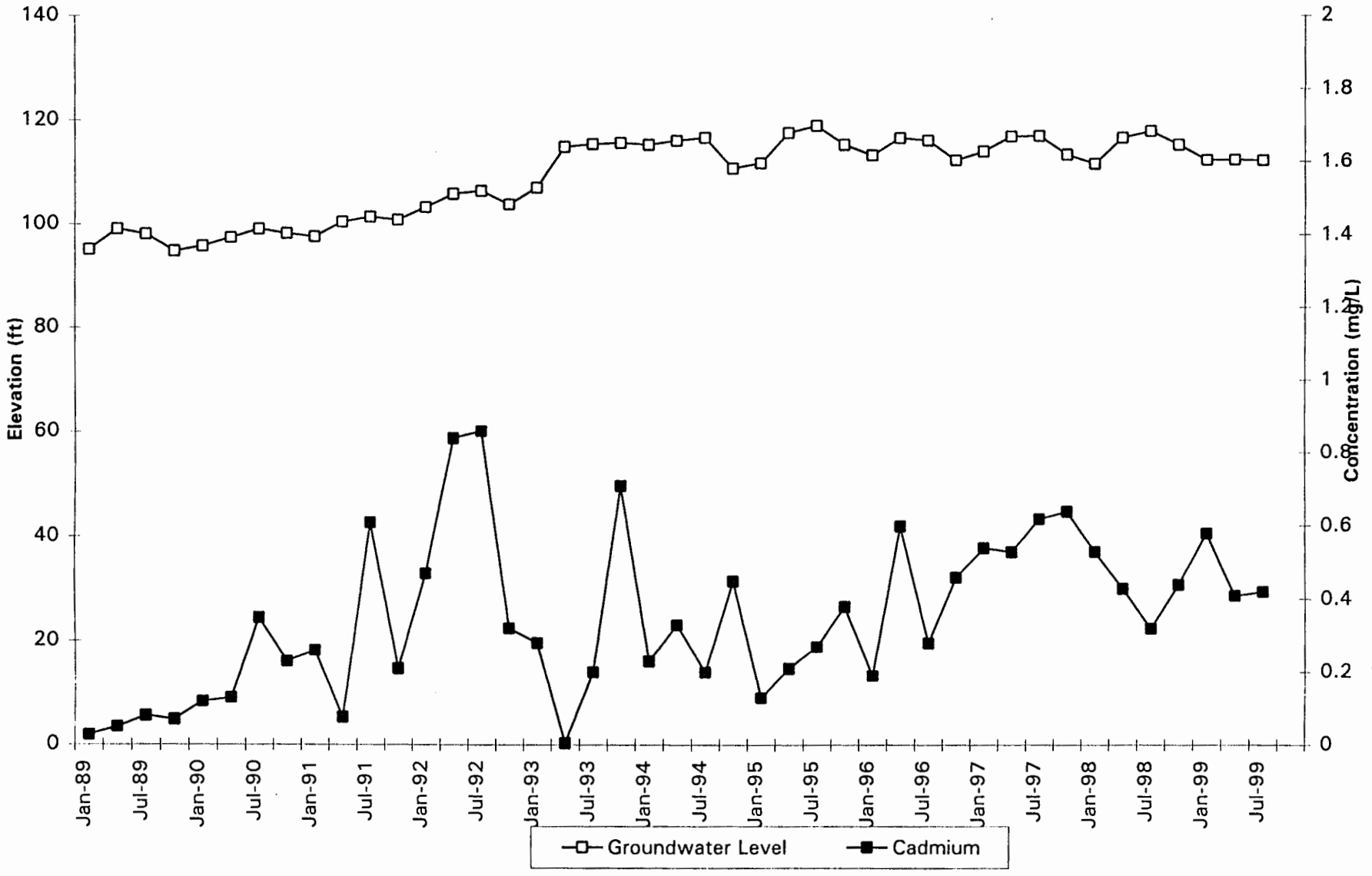

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Cadmium Concentrations - Groundwater Elevations
MW-04
January 1989 - July 1999

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Figure 6-9

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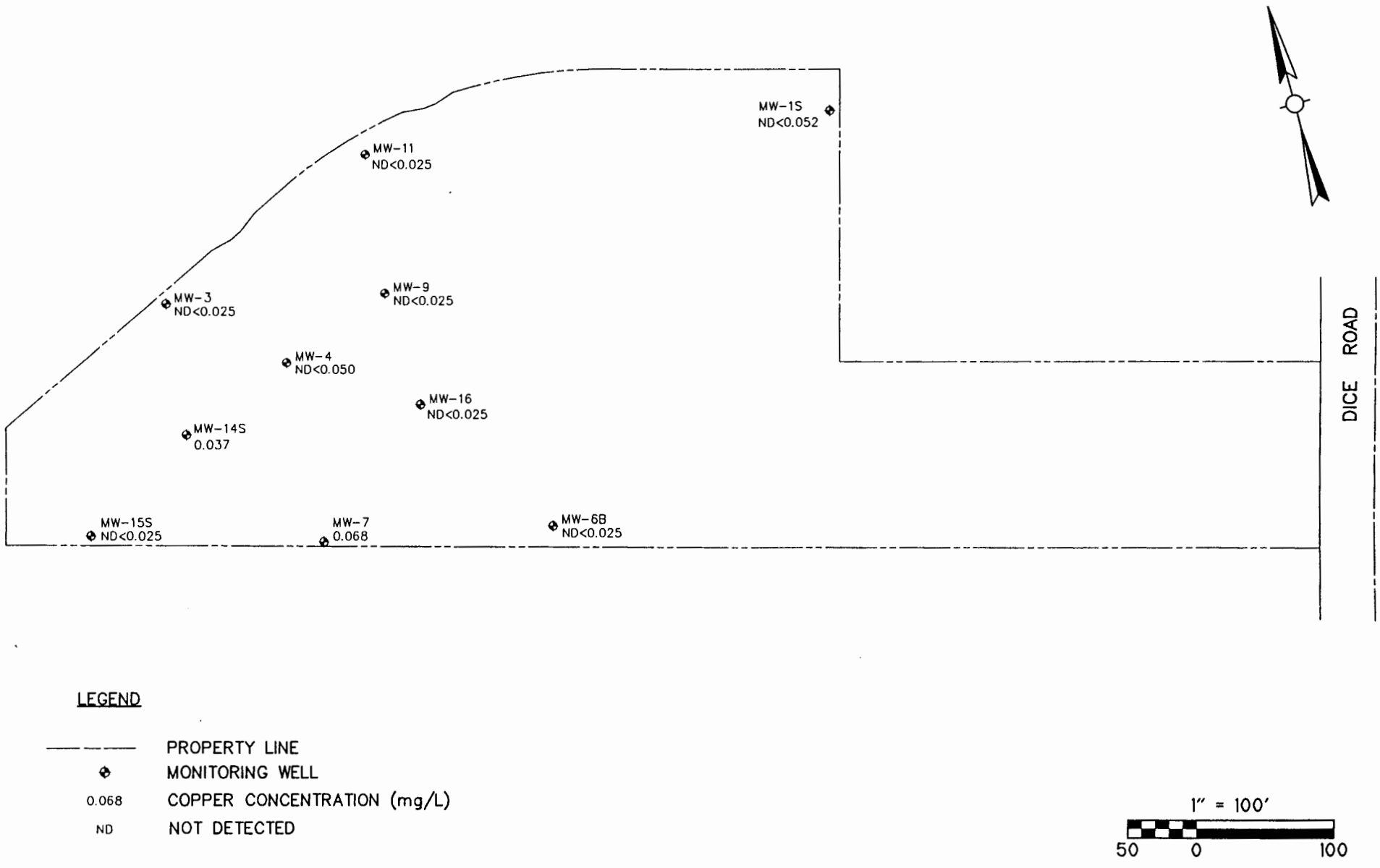

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Copper Concentrations - Shallow Wells
July 1999

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Figure 6-10

Section 7
Statistical Evaluation

The following sections contain a statistical evaluation of the monitoring data designed to determine if onsite wells have been impacted by metals, BTEX compounds (benzene, toluene, ethylbenzene, xylenes) or TCE (trichloroethene). The procedures used are based on the recommendations provided in the 1989 EPA Guidance document, *Statistical Analysis of Ground-water Monitoring Data at RCRA Facilities - Interim Final Guidance* and in the 1992 Addendum document. In some instances, methods which have not been recommended in the documents cited above were used. However, unrecommended techniques were only used to supplement the recommended procedures. When statistical methods outlined in the 1989 guidance document were superseded by the 1992 Addendum, the more recent recommendations were followed.

7.1 Determination of Background Upper Tolerance Limit

Overview

The upper tolerance limit (UTL) is a method that is typically used in compliance monitoring to compare downgradient wells to established maximum contaminant levels (MCLs) or alternate contaminant levels (ACLs). In short, the UTL represents the upper end of the tolerance interval, which is calculated at a specified confidence level and coverage. For instance, a UTL with 95 percent coverage and a 95 percent confidence level represents a value which, with 95 percent confidence, will be exceeded less than 5 percent of the time.

In the present evaluation, we have calculated UTLs for the background well (MW-1S) and compared this value to each individual downgradient analytical result using a confidence level and coverage of 95 percent. When onsite wells exceed the background UTL consistently, it suggests that a significant difference from background may exist. While this is not a recommended technique for detection monitoring, we have applied background UTLs as a screening tool and as a supplement to the more rigorous statistical comparisons that follow.

Methods

Inherent in the calculation of a parametric UTL is the assumption of a normal (or log normal) data distribution. One of the tests for normality recommended in the 1992 Addendum to the EPA guidance document is the probability plot. When a data set is normally distributed, the corresponding probability plot is linear. However, for the background well, the analyses have a high percentage of nondetects for most parameters. Therefore, the probability plots appear to be nonlinear (see Appendix E-3). Fortunately, several methods are available to adjust the mean and standard deviation (used in the calculation of the UTL) based on various treatment of nondetects that allow the use of a parametric UTL. In a parametric UTL, the magnitude of the analyses are considered, while in a nonparametric analysis, the data is ranked from highest to lowest and the UTL is calculated from the ranks. The choice of method depends on the percentage of nondetects in the population and on comparison of special probability plots designed to test the assumptions built into each model. Parametric methods for determination of the UTL are described below. When the

percentage of nondetects is above 90 percent, the UTL is calculated using a nonparametric method employing the Poisson model. In the Poisson model, detected values are treated as "rare events," such that the probability of occurrence is low, but constant. The model takes into account both the frequency of occurrence of detected values as well as the magnitude. Since the Poisson model is nonparametric, a normal or log normal data distribution is not required.

When the frequency of detect is greater than 10 percent and data are normally or log normally distributed, either the Atchison or Cohen adjustment is recommended. In the Atchison method, nondetects are assumed to equal zero, and therefore are not considered in the data distribution. In the Cohen adjustment, nondetects are assumed to have finite values between zero and the detection limit. Experience at EPA and USGS (EPA 1992) have shown that, in general, when the frequency of detect (FOD) is between 10 and 50 percent, Atchison's method is more valid; while between 50 and 90 percent FOD, Cohen's method is more valid. However, this is only a rule of thumb that should be verified periodically using the detects-only and censored probability plot method described above.

Results

The frequencies of detection for each parameter in the background well (MW-1S) is provided in Table 7-1. For hexavalent chromium, cadmium, and benzene, the FOD was less than 10 percent and the Poisson nonparametric method was used to calculate the UTL. Total chromium, copper, toluene, ethylbenzene, and total xylenes analyses were all between 10 and 50 percent FOD, suggesting that the Atchison adjustment should be employed before calculating the UTL. For trichloroethene (TCE), the data were both normally and log normally distributed (see Appendices E-2 and E-3) and the FOD was 100 percent; therefore, no adjustment was required, and the UTL was calculated directly.

The results of the UTL calculations and the comparison with each onsite well are presented in Table 7-2. Based on the number of analyses above the UTL for each onsite well, MW-3, MW-4, MW-7, MW-9, and MW-11 appear to differ from background with respect to the BTEX compounds. MW-4, MW-9, and MW-14S also appear to differ from background with respect to total chromium and copper. Note that the comparison of background UTLs to onsite wells described above is not definitive and will only be used in conjunction with the more in-depth statistical approaches that follow.

7.2 Comparison of Background and Onsite Wells

Overview

The recommended method for comparing onsite wells to background is the analysis of variance (ANOVA). There are two types of ANOVA — parametric and nonparametric. In order to use the parametric ANOVA, the data set must be normally or log normally distributed and the group variances must be equal. For the nonparametric approach, neither normality or equal variances are required, however, slightly larger datasets are needed to use a nonparametric method compared to the parametric ANOVA. The minimum number of analyses for the nonparametric test is 9, while for the parametric test, only 6 are required (EPA 1989).

The first assumption (normal or log normal distribution) should be tested using either the Shapiro-Wilk or probability plot method when the sample size is 50 or less. In general, the Shapiro-Wilk test is much more stringent than the probability plot since the method tends to focus on the "tails" of the distribution. The Lillifors, while not recommended in the Addendum, was suggested in the Interim Final Guidance (EPA 1989) and has been included for comparative purposes.

The test for equal group variances suggested in the Addendum to the Interim Final Guidance (EPA 1992) is the box plot. In a box plot, the extent of each box represent the 25th and 75th percentiles of the data set. Therefore, a long box tends to represent a larger variance than a short box. EPA (1992) recommends using a nonparametric ANOVA if the length of the largest box is equal to or greater than three times that of the smallest box. Another suggested criteria for a parametric ANOVA is a combined FOD, for both the background and the onsite well under consideration, of greater than 50 percent.

Methods

Normality tests were performed only for TCE (see Appendix E of the October 1998 report), since for the other parameters, the combined FOD was <50 percent, precluding the use of the parametric ANOVA method. Results of the probability plot, and Shapiro-Wilk tests are presented in Table 7-3, while the raw data are in Appendices E-2 and E-3, respectively. Due to the stringent nature of the Shapiro-Wilk test, less weight was given to this test than the probability plots when conflicting results were obtained. Based on Table 7-3 of the October 1998 report, the TCE data are log normal in all wells except MW-3, MW-6B, MW-9, and MW-4. The log normal data distribution is typical of environmental datasets where various degrees of dilution have occurred. The lack of normality or log normality precluded the use of a parametric ANOVA for wells MW-3 MW-6B, and MW-9.

In order to test the equal group variances assumption, box plots were constructed for TCE in each well (see Appendix E-4 of the October 1998 report). The results indicate that the background box is less than ⅓ the length of the box for well MW-6B, indicating that this well cannot be compared to background using a parametric ANOVA. However, all other wells met the equal variance requirement.

A summary of the ANOVA method used is as follows:

- MW-4, MW-11, MW-14S, MW-15S, and MW-16 for TCE — parametric ANOVA using ½ D.L. for nondetects
- All other parameters and wells — nonparametric, Kruskal Wallis Mann Whitney U Test

Note that ½ D.L. was used when the FOD was greater than 85 percent in a single well.

Results

The results of the nonparametric and parametric ANOVA tests are included in Appendices E-2 and E-3, respectively, while a summary is provided in Table 7-3. An " R" indicates that the null hypothesis was rejected, or that the two wells are not the same, while an "A" indicates the null hypothesis was accepted. In general, the results are similar to the UTL comparisons; except well

MW-16 appears to differ from background with respect to the BTEX compounds. The results for TCE were obtained using both the normal and log normal assumptions for comparative purposes. The results indicate that, regardless of the data distribution, only well MW-6B was the same as background with respect to TCE. Since the last quarter, hexavalent chromium in well MW-9 is no longer the same as background. However, total xylenes in well MW-6B which was predicted to be different from background last quarter, is now predicted to be the same.

Table 7-1
Percent of Total Samples in Shallow Wells Reported Above the Detection Limit
Quarterly Data: January 1989 to July 1999 at Philbro-Tech, Inc.

Parameter	*MW-1S*	*MW-3*	*MW-4*	*MW6B*	*MW-7*	*MW-9*	*MW-11*	*MW-14S*	*MW-15S*	*MW-16*
Number Samples (n)	43	43	43	39	43	43	43	35	36	30
Metals (mg/L) (%)										
Hexavalent chromium	2.3	2.3	100.0	0	2.3	25.6	2.3	48.6	5.6	0
Total chromium	11.6	7.1	97.7	28.2	20.9	37.2	11.6	80.0	36.1	6.7
Cadmium	2.3	0	97.7	0	4.7	4.7	0	17.1	19.4	0
Copper	25.6	11.6	32.6	5.1	44.2	11.6	25.6	54.3	13.9	16.7
Aromatics (µg/L) (%)										
Benzene	2.3	11.6	18.6	0	20.9	7.0	0	17.1	0	0
Toluene	9.5	16.7	35.7	42.1	16.7	38.1	45.2	20.6	28.6	20.7
Ethylbenzene	30.2	53.5	86.0	46.2	46.5	69.8	88.4	77.1	58.3	83.3
Total xylenes	32.6	41.9	86.0	48.7	34.9	58.1	72.1	62.9	58.3	50.0
Halocarbons (µg/L) (%)										
Trichloroethene	100.0	97.7	93.0	100.0	100.0	93.0	95.3	100.0	97.2	100.0

% = Percent detected

Table 7-2
Definition of Upper Tolerance Levels in Background Shallow Wells
Quarterly Data: January 1989 to July 1999 at Philbro-Tech, Inc.

Parameter	% Detected in Bkgd [1]	Tolerance Limit Method	Upper Tolerance Limit [2]	Upper Tolerance Limit Exceeded								
				MW-3 43 [3]	MW-4 43	MW-6B 39	MW-7 43	MW-9 43	MW-11 43	MW-14S 35	MW-15S 36	MW-16 30
Metals (mg/L)												
Hexavalent chromium	2.3	P	1.0	–	41 [4]	–	–	5	–	1	–	–
Total chromium	11.6	A	0.046	2	13 (1)	1	2	14	–	14 (1)	–	–
Cadmium	2.3	P	0.5	–	11	–	–	–	–	–	–	–
Copper	25.6	A	0.032	4 (1)	10 (3)	3 (1)	14 (2)	4 (1)	8 (1)	11	–	3
Aromatics (µg/L)												
Benzene	2.3	P	19.50	3[5] (3)	8 (7)	–	–	14 (14)	6 (6)	1 (1)	–	3 (3)
Toluene	9.5	A	1.3	15 (8)	34 (19)	14 (1)	12 (7)	32 (16)	33 (14)	11 (6)	4 (1)	18 (13)
Ethylbenzene	30.2	A	2.4	15 (3)	38 (2)	13 (1)	16 (4)	35 (6)	38 (3)	24	–	25 (2)
Total xylenes	32.6	A	5.0	13 (3)	39 (3)	14	8 (1)	29 (5)	28 (4)	14 (1)	10	12 (4)
Halocarbons (µg/L)												
Trichloroethene	100.0	T	21.0	31 (1)	43 (3)	10	41	42 (3)	41	30	1	28

[1] MW-1S is background shallow well, n = 43
[2] In ppm or ppb, as noted for groups
[3] Number of samples collected at corresponding well
[4] Number of samples that exceed upper tolerance level at corresponding well
[5] (6) number of samples exceeding limit that are reported as ND
– = None of samples exceeded the upper tolerance limit
P = Poisson
A = Atchison adjusted
T = Unadjusted limit

Table 7-3
Comparison of Background and Onsite Shallow Wells
Quarterly Data: January 1989 to July 1999 at Phibro-Tech, Inc.

Parameter	*MW-3*	*MW-4*	*MW-6B*	*MW-7*	*MW-9*	*MW-11*	*MW-14S*	*MW-15S*	*MW-16*
Metals (mg/L)									
Hexavalent chromium [1]	A	R	A	A	R	A	R	A	A
Total chromium [1]	A	R	R	A	R	A	R	A	A
Cadmium [1]	A	R	A	A	A	A	A	A	A
Copper [1]	A	A	A	R	A	A	R	A	A
Aromatics (µg/L)									
Benzene [1]	R	R	A	R	R	R	R	A	R
Toluene [1]	R	R	R	R	R	R	R	A	R
Ethylbenzene [1]	R	R	R	R	R	R	R	R	R
Total xylenes [1]	R	R	A	A	R	R	R	A	R
Halocarbons (µg/L)									
Trichloroethene [2]	R [3]	R [4]/R [5]	A [3]	R [3]	R/R	R [3]	R/R	R/R	R/R

[1] Background to onsite comparison by Mann Whitney U Method, using D.L. for ND, at 95 percent confidence level
[2] Background to onsite comparison by one way ANOVA Method using ½ D.L. for ND
[3] Nonparametric comparison used for TCE
[4] Normal Distribution used in comparison
[5] Log normal Distribution used in comparison
A Null Hypothesis, that means are equal, is accepted
R Null Hypothesis, that means are equal, is rejected
R/R Null Hypothesis, rejected using parametric (top letter) and nonparametric (bottom letter) tests

Section 8
Assessment of Quarterly Groundwater Monitoring Program Status

In the October 1990 groundwater monitoring report, changes in the quarterly groundwater sampling program were proposed. These changes were first implemented during the April 1991 sampling event and included reducing the number of wells sampled and parameters analyzed in each well. The current groundwater sampling program will only be used as an interim groundwater sampling program, until a remediation alternative from the Corrective Measures Study (CMS) has been selected by EPA.

The analytical parameters for the July 1999 quarterly monitoring were as follows:

Wells	*Purgeable Halogenated/ Aromatic Organics (EPA 8260)*	*Chromium, Cadmium, Copper*	*Hexavalent Chromium*	*pH*
MW-01S, MW-01D	X	X	X	X
MW-03, MW-04A	X	X	X	X
MW-11 MW-06B	X	X	X	X
MW-06D, MW-07	X	X	X	X
MW-09, MW-04	X	X	X	X
MW-14S, MW-15S	X	X	X	X
MW-15D, MW-16	X	X	X	X

Beginning with the January 1997 sampling event, EPA Method 8010/8020 was replaced with EPA Method 8260. This change was requested by the analytical laboratory, which no longer performs 8010/8020 analysis. Methyl tertiary butyl ether (MTBE) analysis was performed once, in January 1997. Since there were no detections of MTBE in any of the groundwater samples, this analysis was discontinued.

Statistical analysis was historically conducted annually. Beginning with the October 1993 sampling event, statistical analysis has been performed on a quarterly basis, as requested by DTSC.

The proposed October 1999 quarterly monitoring includes sampling the 14 wells for purgeable halogenated/aromatic organics using EPA Method 8260, chromium, cadmium, copper, hexavalent chromium, and pH. The water levels at the 14 wells sampled, in addition to the remaining unsampled wells, will also be measured.

Section 9
References

Camp Dresser & McKee Inc., Groundwater Modeling Study, Southern California Chemical, January 1993.

_____, RCRA Facility Investigation Work Plan Addendum, Southern California Chemical, February 13, 1992, Revised March 6, 1992.

_____, RCRA Facility Investigation Report, Southern California Chemical, December 6, 1991.

_____, RCRA Facility Investigation Work Plan, Southern California Chemical, June 26, 1990.

_____, Current Conditions Report, Southern California Chemical, June 8, 1990.

City of Santa Fe Springs, 1996 Annual Water Quality Report, 1996.

J.H. Kleinfelder & Associates, Quality Assurance Project Plan, Southern California Chemical, May 1988.

_____, Draft Environmental Assessment, Southern California Chemical, January 1986.

Appendix A
General Analytical Detection Limits

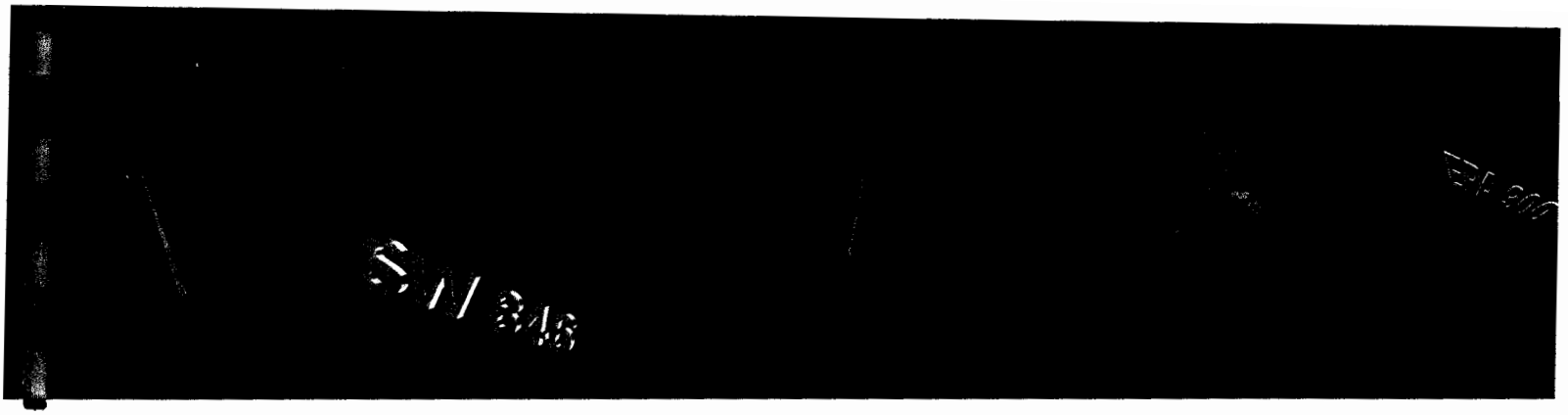
TABLE A-1
PHIBRO-TECH, INC.
HEAVY METALS AND INORGANICS ANALYSIS
Typical Detection Limits

Method Number	Analytical Parameter	Detection Limit	Units
EPA 6010-L	Antimony	0.06	mg/L
EPA 6010-L	Barium	0.01	mg/L
EPA 6010-L	Beryllium	0.002	mg/L
EPA 6010-L	Cadmium	0.005	mg/L
EPA 6010-L	Chromium	0.01	mg/L
EPA 6010-L	Cobalt	0.01	mg/L
EPA 6010-L	Copper	0.02	mg/L
EPA 6010-L	Lead	0.05	mg/L
EPA 6010-L	Molybdenum	0.02	mg/L
EPA 6010-L	Nickel	0.04	mg/L
EPA 6010-L	Silver	0.01	mg/L
EPA 6010-L	Thallium	0.5	mg/L
EPA 6010-L	Tin	0.1	mg/L
EPA 6010-L	Vanadium	0.01	mg/L
EPA 6010-L	Zinc	0.02	mg/L
EPA 7196	Chromium, Hexaval	0.02	mg/L
EPA 7061-L	Arsenic	0.005	mg/L
EPA 9012	Cyanide, Total	0.01	mg/L
EPA 7470	Mercury	0.001	mg/L
EPA 300.0	Chloride	5	mg/L
EPA 300.0	Nitrate	0.2	mg/L
EPA 7741-L	Selenium	0.1	mg/L
EPA 376.2	Sulfide, as Sulfur	1.2	mg/L

TABLE A-2
PHIBRO-TECH, INC.
VOLATILE ORGANIC COMPOUNDS
Typical Detection Limits

Method Number	Analytical Parameter	Detection Limit	Units
EPA 8260	Benzene	0.5	µg/L
EPA 8260	Toluene	1.0	µg/L
EPA 8260	Ethylbenzene	1.0	µg/L
EPA 8260	Xylenes, Total	1.0	µg/L
EPA 8260	Chloromethane	1.0	µg/L
EPA 8260	Bromomethane	1.0	µg/L
EPA 8260	Vinyl Chloride	1.0	µg/L
EPA 8260	Chloroethane	1.0	µg/L
EPA 8260	Methylene Chloride	1.0	µg/L
EPA 8260	Trichlorofluoromethane	1.0	µg/L
EPA 8260	1,1-Dichloroethene	1.0	µg/L
EPA 8260	1,1-Dichloroethane	1.0	µg/L
EPA 8260	trans-1,2-Dichloroethene	1.0	µg/L
EPA 8260	Chloroform	1.0	µg/L
EPA 8260	1,2-Dichloroethane	1.0	µg/L
EPA 8260	1,1,1-Trichloroethane	1.0	µg/L
EPA 8260	Carbon Tetrachloride	1.0	µg/L
EPA 8260	Bromodichloromethane	1.0	µg/L
EPA 8260	1,2-Dichloropropane	1.0	µg/L
EPA 8260	trans-1,3-Dichloropropen	1.0	µg/L
EPA 8260	Trichloroethene	1.0	µg/L
EPA 8260	Dibromochloromethane	1.0	µg/L
EPA 8260	1,1,2-Trichloroethane	1.0	µg/L
EPA 8260	cis-1,3-Dichloropropene	1.0	µg/L
EPA 8260	2-Chloroethylvinyl ether	1.0	µg/L
EPA 8260	Bromoform	1.0	µg/L
EPA 8260	Tetrachloroethene	1.0	µg/L
EPA 8260	1,1,2,2-Tetrachloroethane	1.0	µg/L
EPA 8260	Chlorobenzene	1.0	µg/L
EPA 8260	1,2-Dichlorobenzene	1.0	µg/L
EPA 8260	1,3-Dichlorobenzene	1.0	µg/L
EPA 8260	1,4-Dichlorobenzene	1.0	µg/L

Appendix B
Quanterra Analytical Reports



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Quanterra
1721 South Grand Ave.
Santa Ana, CA 92705

Tel (714) 258-8610
Fax (714) 258-0921

July 28, 1999

QUANTERRA INCORPORATED LOT NUMBER: E9G200220
PO/CONTRACT: 2279-11462-111.FLD

Ed Vigil
Phibro Tech, Inc.
8851 Dice Road
Santa Fe Springs, CA 90670

Dear Mr. Vigil,

This report contains the analytical results for the three samples received under chain of custody by Quanterra Incorporated on July 20, 1999. These samples are associated with your PTI - Santa Fe Springs Quarterly project.

All applicable quality control procedures met method-specified acceptance criteria.

This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions, please feel free to call me at 714-258-8610.

Sincerely,

Diane Suzuki
Project Manager

CC: Project File
Sharon Wallin, Camp Dresser & McKee, Inc.

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Laboratory/Client Sample Cross-Reference

Lab Sample ID	Client Sample ID	Date	Matrix
E9G200220-001	PTI-MW1S-044	07/20/99	Water
E9G200220-002	PTI-MW1D-044	07/20/99	Water
E9G200220-003	PTI-TB01-044	07/20/99	Water

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Analytical Data Report

Client:

GC/MS Volatiles

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Analytical Data Report

Client:

Client Sample ID: PTI-MW1S-044
Lab Sample ID: E9G200220-001

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9202162
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/20/99
Date Prepared: 07/20/99
Date Analyzed: 07/20/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	ND	1.0	0.30	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	ND	1.0	0.20	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	**1.6**	**1.0**	**0.20**	
1,2-Dichloroethane	ND	1.0	0.20	
1,1-Dichloroethene	**1.0**	**1.0**	**0.20**	
cis-1,2-Dichloroethene	**5.3**	**1.0**	**0.30**	
trans-1,2-Dichloroethene	ND	1.0	0.30	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	ND	1.0	0.20	
Methylene chloride	ND	1.0	0.20	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	**16**	**1.0**	**0.20**	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	**9.1**	**1.0**	**0.20**	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	91	70-130	
1,2-Dichloroethane-d4	98	60-140	
Toluene-d8	104	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-MW1D-044
Lab Sample ID: E9G200220-002

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9202162
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/20/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	ND	1.0	0.30	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	ND	1.0	0.20	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	ND	1.0	0.20	
1,2-Dichloroethane	ND	1.0	0.20	
1,1-Dichloroethene	ND	1.0	0.20	
cis-1,2-Dichloroethene	ND	1.0	0.30	
trans-1,2-Dichloroethene	ND	1.0	0.30	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	ND	1.0	0.20	
Methylene chloride	ND	1.0	0.20	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	**24**	**1.0**	**0.20**	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	**2.7**	**1.0**	**0.20**	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	86	70-130	
1,2-Dichloroethane-d4	96	60-140	
Toluene-d8	100	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-TB01-044
Lab Sample ID: E9G200220-003

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9202162
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/20/99
Date Prepared: 07/20/99
Date Analyzed: 07/20/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	ND	1.0	0.30	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	ND	1.0	0.20	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	ND	1.0	0.20	
1,2-Dichloroethane	ND	1.0	0.20	
1,1-Dichloroethene	ND	1.0	0.20	
cis-1,2-Dichloroethene	ND	1.0	0.30	
trans-1,2-Dichloroethene	ND	1.0	0.30	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	ND	1.0	0.20	
Methylene chloride	ND	1.0	0.20	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	ND	1.0	0.20	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	ND	1.0	0.20	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	86	70-130	
1,2-Dichloroethane-d4	93	60-140	
Toluene-d8	101	70-130	

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Analytical Data Report

Client:

Metals

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Analytical Data Report

Client:

Client Sample ID: PTI-MW1S-044
Lab Sample ID: E9G200220-001

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9202238
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/20/99
Date Prepared: 07/21/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	ND	0.010	0.0010	1	
Copper	**0.052**	**0.025**	**0.0040**	**1**	

Client Sample ID: PTI-MW1D-044
Lab Sample ID: E9G200220-002

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9202238
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/20/99
Date Prepared: 07/21/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	ND	0.010	0.0010	1	
Copper	ND	0.025	0.0040	1	

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Analytical Data Report

Client:

Classical Chemistry

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Analytical Data Report

Client:

Client Sample ID: **PTI-MW1S-044**
Lab Sample ID: E9G200220-001

Hexavalent Chromium
Hexavalent Chromium

Batch: 9201427
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/20/99
Date Prepared: 07/20/99
Date Analyzed: 07/20/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: **PTI-MW1S-044**
Lab Sample ID: E9G200220-001

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9201425
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/20/99
Date Prepared: 07/20/99
Date Analyzed: 07/20/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**7.0**	**0.10**	**0.0**	**1**	

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Analytical Data Report

Client:

Client Sample ID: **PTI-MW1D-044**
Lab Sample ID: E9G200220-002

Hexavalent Chromium
Hexavalent Chromium

Batch: 9201427
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/20/99
Date Prepared: 07/20/99
Date Analyzed: 07/20/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: **PTI-MW1D-044**
Lab Sample ID: E9G200220-002

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9201425
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/20/99
Date Prepared: 07/20/99
Date Analyzed: 07/20/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**7.6**	**0.10**	**0.0**	**1**	

Quality Control Batch Assignment Report

Lab Sample ID	Matrix	Method	Batch ID	MS Run Number
Metals				
E9G200220-001	WATER	6010B	9202238	9202074
E9G200220-002	WATER	6010B	9202238	9202074
GC/MS Volatiles				
E9G200220-001	WATER	8260B	9202162	9202038
E9G200220-002	WATER	8260B	9202162	9202038
E9G200220-003	WATER	8260B	9202162	9202038
Classical Chemistry				
E9G200220-001	WATER	7196A	9201427	
E9G200220-001		9040B	9201425	
E9G200220-002	WATER	7196A	9201427	
E9G200220-002		9040B	9201425	

Metals

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Quality Control Reports

Batch ID: 9202238
Inductively Coupled Plasma (6010B)

Method Blank

Lab Sample ID: E9G210000-238B
Matrix: Water
Units: mg/L

Analyte	Result	RL	Qual.	Date Analyzed
Cadmium	ND	0.0050		07/22/99
Chromium	ND	0.010		07/22/99
Copper	ND	0.025		07/22/99

Laboratory Control Sample

Lab Sample ID: E9G210000-238C
Matrix: Water
Units: mg/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qual.
Cadmium	0.0500	0.0517	103	80-120	
Chromium	0.200	0.210	105	80-120	
Copper	0.250	0.239	96	80-120	

Matrix Spike / Matrix Spike Duplicate

Lab Sample ID E9G200220-001S
Matrix: Water
Units: mg/L

Analyte	Sample Result	Spike Amount	Result MS	Result MSD	% Rec. MS	% Rec. MSD	Control Limits	RPD	Qualifier MS	Qualifier MSD
Cadmium	ND	0.0500	0.0489	0.0485	98	97	80-120	0.69		
Chromium	ND	0.200	0.203	0.204	100	100	80-120	0.20		
Copper	0.052	0.250	0.324	0.322	109	108	80-120	0.37		

Classical Chemistry

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Quality Control Reports

Batch ID: 9201427
Hexavalent Chromium

Method Blank

Lab Sample ID: E9G200000-427B
Matrix: Water
Units: mg/L

Analyte	Result	RL	Qual.	Date Analyzed
Hexavalent Chromium	ND	0.020		07/20/99

Laboratory Control Sample

Lab Sample ID: E9G200000-427C
Matrix: Water
Units: mg/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qual.
Hexavalent Chromium	0.0500	0.0510	102	80-120	

Laboratory Control Sample

Lab Sample ID: E9G200000-425C
Matrix: Water
Units: No Units

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qual.
pH	9.18	8.77	96	90-110	

GC/MS Volatiles

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Quality Control Reports

Batch ID: 9202162
Volatile Organics, GC/MS (8260B)

Method Blank

Lab Sample ID: E9G210000-162B
Matrix: Water
Units: ug/L

Analyte	Result	RL	Qual.	Date Analyzed
Benzene	ND	1.0		07/20/99
Bromodichloromethane	ND	1.0		07/20/99
Bromoform	ND	1.0		07/20/99
Bromomethane	ND	2.0		07/20/99
Carbon tetrachloride	ND	1.0		07/20/99
Chlorobenzene	ND	1.0		07/20/99
Dibromochloromethane	ND	1.0		07/20/99
Chloroethane	ND	2.0		07/20/99
Chloroform	ND	1.0		07/20/99
Chloromethane	ND	2.0		07/20/99
1,2-Dichlorobenzene	ND	1.0		07/20/99
1,3-Dichlorobenzene	ND	1.0		07/20/99
1,4-Dichlorobenzene	ND	1.0		07/20/99
1,1-Dichloroethane	ND	1.0		07/20/99
1,2-Dichloroethane	ND	1.0		07/20/99
1,1-Dichloroethene	ND	1.0		07/20/99
cis-1,2-Dichloroethene	ND	1.0		07/20/99
trans-1,2-Dichloroethene	ND	1.0		07/20/99
1,2-Dichloropropane	ND	1.0		07/20/99
cis-1,3-Dichloropropene	ND	1.0		07/20/99
trans-1,3-Dichloropropene	ND	1.0		07/20/99
Ethylbenzene	ND	1.0		07/20/99
Methylene chloride	ND	1.0		07/20/99
1,1,2,2-Tetrachloroethane	ND	1.0		07/20/99
Tetrachloroethene	ND	1.0		07/20/99
Toluene	ND	1.0		07/20/99
1,1,1-Trichloroethane	ND	1.0		07/20/99
1,1,2-Trichloroethane	ND	1.0		07/20/99
Trichloroethene	ND	1.0		07/20/99
Trichlorofluoromethane	ND	2.0		07/20/99
Vinyl chloride	ND	2.0		07/20/99
m-Xylene & p-Xylene	ND	1.0		07/20/99
o-Xylene	ND	1.0		07/20/99

Batch ID: 9202162

Volatile Organics, GC/MS (8260B)

Method Blank, continued

Lab Sample ID: E9G210000-162B
Matrix: Water
Units: ug/L

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	92	70-130	
1,2-Dichloroethane-d4	93	60-140	
Toluene-d8	107	70-130	

Laboratory Control Sample

Lab Sample ID: E9G210000-162C
Matrix: Water
Units: ug/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qual.
Benzene	10.0	10.4	104	70-130	
Chlorobenzene	10.0	10.2	102	70-130	
1,1-Dichloroethene	10.0	8.50	85	60-140	
Toluene	10.0	10.7	107	70-130	
Trichloroethene	10.0	9.10	91	70-130	
Surrogate					
Bromofluorobenzene	10.0	9.80	98	70-130	
1,2-Dichloroethane-d4	10.0	9.96	100	60-140	
Toluene-d8	10.0	11.5	115	70-130	

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Quality Control Reports

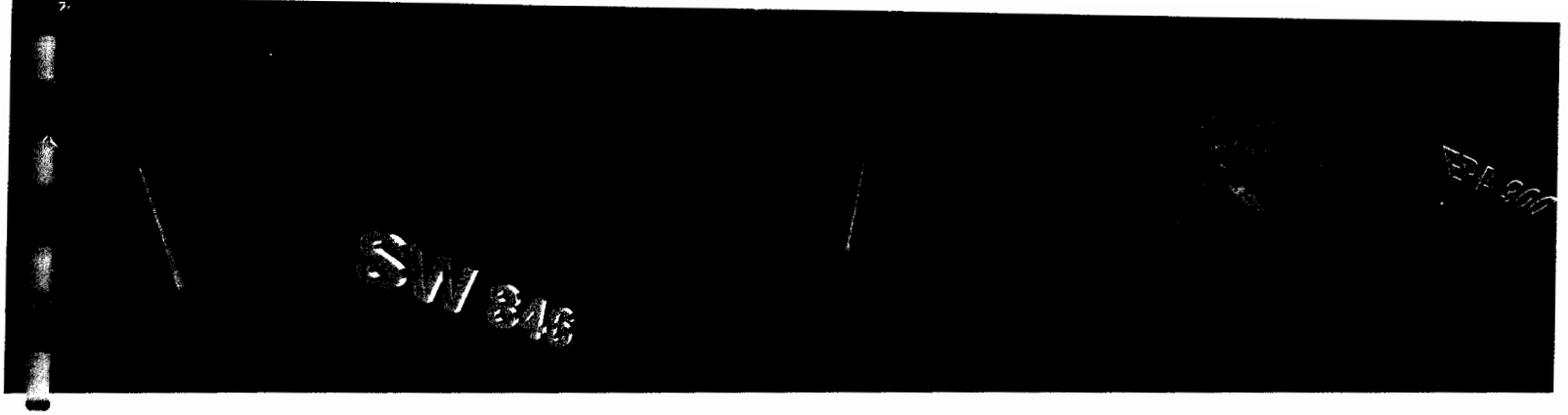
Batch ID: 9202162

Volatile Organics, GC/MS (8260B)

Matrix Spike / Matrix Spike Duplicate

Lab Sample ID E9G200220-001S
Matrix: Water
Units: ug/L

Analyte	Sample Result	Spike Amount	Result MS	Result MSD	% Rec. MS	% Rec. MSD	Control Limits	RPD	Qualifier MS	Qualifier MSD
Benzene	ND	10.0	9.00	8.97	90	90	70-130	0.33		
Chlorobenzene	ND	10.0	9.24	9.05	92	90	70-130	2.1		
1,1-Dichloroethene	1.0	10.0	8.98	8.80	80	78	60-140	2.0		
Toluene	ND	10.0	9.06	8.84	91	88	70-130	2.4		
Trichloroethene	9.1	10.0	18.5	18.4	94	93	70-130	0.27		
Surrogate										
Bromofluorobenzene	9.1	10.0	9.51	9.57	95	96	70-130			
1,2-Dichloroethane-d4	9.8	10.0	11.0	11.2	110	112	60-140			
Toluene-d8	10	10.0	10.3	10.0	103	100	70-130			



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Quanterra
1721 South Grand Ave.
Santa Ana, CA 92705

Tel (714) 258-8610
Fax (714) 258-0921

August 3, 1999

QUANTERRA INCORPORATED LOT NUMBER: E9G210237
PO/CONTRACT: 2279-11462-111.FLD

Sharon Wallin
Camp, Dresser, McKee
18881 Von Karman, Suite 650
Irvine, CA 92612

Dear Ms. Wallin,

This report contains the analytical results for the eight samples received under chain of custody by Quanterra Incorporated on July 21, 1999. These samples are associated with your PTI - Santa Fe Springs project.

All applicable quality control procedures met method-specified acceptance criteria.

This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions, please feel free to call me at 714-258-8610.

Sincerely,

Diane Suzuki
Project Manager

CC: Project File
Ed Vigil, Phibro Tech

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Laboratory/Client Sample Cross-Reference

Lab Sample ID	Client Sample ID	Date	Matrix
E9G210237-001	PTI-MW3-044	07/21/99	Water
E9G210237-002	PTI-MW11-044	07/21/99	Water
E9G210237-003	PTI-MW6D-044	07/21/99	Water
E9G210237-004	PTI-EB01-044	07/21/99	Water
E9G210237-005	PTI-MW6B-044	07/21/99	Water
E9G210237-006	PTI-MW7-044	07/21/99	Water
E9G210237-007	PTI-MW4A-044	07/21/99	Water
E9G210237-008	PTI-TB02-044	07/21/99	Water

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Analytical Data Report

Client:

GC/MS Volatiles

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Analytical Data Report

Client:

Client Sample ID: PTI-MW3-044
Lab Sample ID: E9G210237-001

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9203222
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	**41**	**1.0**	**0.30**	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	**30**	**1.0**	**0.20**	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	**3.6**	**1.0**	**0.20**	
1,2-Dichloroethane	ND	1.0	0.20	
1,1-Dichloroethene	**9.0**	**1.0**	**0.20**	
cis-1,2-Dichloroethene	ND	1.0	0.30	
trans-1,2-Dichloroethene	ND	1.0	0.30	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	**1.3**	**1.0**	**0.20**	
Methylene chloride	ND	1.0	0.20	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	**37**	**1.0**	**0.20**	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	**1.8**	**1.0**	**0.20**	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	**43**	**1.0**	**0.20**	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	85	70-130	
1,2-Dichloroethane-d4	89	60-140	
Toluene-d8	103	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-MW11-044
Lab Sample ID: E9G210237-002

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9203222
Matrix: Water
Units: ug/L
Dil. Factor: 10
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	10	3.0	
Bromodichloromethane	ND	10	2.0	
Bromoform	ND	10	3.0	
Bromomethane	ND	20	5.0	
Carbon tetrachloride	ND	10	3.0	
Chlorobenzene	ND	10	3.0	
Dibromochloromethane	ND	10	2.0	
Chloroethane	ND	20	3.0	
Chloroform	**30**	**10**	**2.0**	
Chloromethane	ND	20	3.0	
1,2-Dichlorobenzene	ND	10	2.0	
1,3-Dichlorobenzene	ND	10	2.0	
1,4-Dichlorobenzene	ND	10	3.0	
1,1-Dichloroethane	**250**	**10**	**2.0**	
1,2-Dichloroethane	**12**	**10**	**2.0**	
1,1-Dichloroethene	**69**	**10**	**2.0**	
cis-1,2-Dichloroethene	**28**	**10**	**3.0**	
trans-1,2-Dichloroethene	ND	10	3.0	
1,2-Dichloropropane	ND	10	2.0	
cis-1,3-Dichloropropene	ND	10	2.0	
trans-1,3-Dichloropropene	ND	10	2.0	
Ethylbenzene	**85**	**10**	**2.0**	
Methylene chloride	ND	10	2.0	
1,1,2,2-Tetrachloroethane	ND	10	3.0	
Tetrachloroethene	**25**	**10**	**2.0**	
Toluene	ND	10	2.0	
1,1,1-Trichloroethane	**17**	**10**	**2.0**	
1,1,2-Trichloroethane	ND	10	2.0	
Trichloroethene	**740**	**10**	**2.0**	
Trichlorofluoromethane	ND	20	2.0	
Vinyl chloride	ND	20	3.0	
m-Xylene & p-Xylene	ND	10	5.0	
o-Xylene	ND	10	2.0	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	90	70-130	
1,2-Dichloroethane-d4	96	60-140	
Toluene-d8	114	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-MW6D-044
Lab Sample ID: E9G210237-003

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9203222
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/21/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	ND	1.0	0.30	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	ND	1.0	0.20	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	**2.6**	**1.0**	**0.20**	
1,2-Dichloroethane	ND	1.0	0.20	
1,1-Dichloroethene	**1.6**	**1.0**	**0.20**	
cis-1,2-Dichloroethene	ND	1.0	0.30	
trans-1,2-Dichloroethene	ND	1.0	0.30	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	**4.4**	**1.0**	**0.20**	
Methylene chloride	ND	1.0	0.20	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	**16**	**1.0**	**0.20**	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	**23**	**1.0**	**0.20**	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	85	70-130	
1,2-Dichloroethane-d4	93	60-140	
Toluene-d8	103	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-EB01-044
Lab Sample ID: E9G210237-004

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9203222
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	ND	1.0	0.30	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	ND	1.0	0.20	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	ND	1.0	0.20	
1,2-Dichloroethane	ND	1.0	0.20	
1,1-Dichloroethene	ND	1.0	0.20	
cis-1,2-Dichloroethene	ND	1.0	0.30	
trans-1,2-Dichloroethene	ND	1.0	0.30	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	ND	1.0	0.20	
Methylene chloride	ND	1.0	0.20	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	ND	1.0	0.20	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	ND	1.0	0.20	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	87	70-130	
1,2-Dichloroethane-d4	89	60-140	
Toluene-d8	102	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-MW6B-044
Lab Sample ID: E9G210237-005

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9203222
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B

Date Sampled: 07/21/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	ND	1.0	0.30	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	ND	1.0	0.20	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	ND	1.0	0.20	
1,2-Dichloroethane	ND	1.0	0.20	
1,1-Dichloroethene	ND	1.0	0.20	
cis-1,2-Dichloroethene	ND	1.0	0.30	
trans-1,2-Dichloroethene	ND	1.0	0.30	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	**1.2**	**1.0**	**0.20**	
Methylene chloride	ND	1.0	0.20	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	**8.1**	**1.0**	**0.20**	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	**8.2**	**1.0**	**0.20**	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	82	70-130	
1,2-Dichloroethane-d4	88	60-140	
Toluene-d8	100	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-MW7-044
Lab Sample ID: E9G210237-006

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9203222
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/21/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	ND	1.0	0.30	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	**1.4**	**1.0**	**0.20**	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	**53**	**1.0**	**0.20**	
1,2-Dichloroethane	**16**	**1.0**	**0.20**	
1,1-Dichloroethene	**9.4**	**1.0**	**0.20**	
cis-1,2-Dichloroethene	**21**	**1.0**	**0.30**	
trans-1,2-Dichloroethene	**2.8**	**1.0**	**0.30**	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	**1.3**	**1.0**	**0.20**	
Methylene chloride	ND	1.0	0.20	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	**14**	**1.0**	**0.20**	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	**65**	**1.0**	**0.20**	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	84	70-130	
1,2-Dichloroethane-d4	98	60-140	
Toluene-d8	102	70-130	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-MW4A-044
Lab Sample ID: E9G210237-007

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9203222
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	ND	1.0	0.30	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	ND	1.0	0.20	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	**2.0**	**1.0**	**0.20**	
1,2-Dichloroethane	ND	1.0	0.20	
1,1-Dichloroethene	ND	1.0	0.20	
cis-1,2-Dichloroethene	ND	1.0	0.30	
trans-1,2-Dichloroethene	ND	1.0	0.30	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	ND	1.0	0.20	
Methylene chloride	ND	1.0	0.20	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	**6.3**	**1.0**	**0.20**	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	**5.2**	**1.0**	**0.20**	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	83	70-130	
1,2-Dichloroethane-d4	89	60-140	
Toluene-d8	102	70-130	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-TB02-044
Lab Sample ID: E9G210237-008

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9203222
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	ND	1.0	0.30	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	ND	1.0	0.20	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	ND	1.0	0.20	
1,2-Dichloroethane	ND	1.0	0.20	
1,1-Dichloroethene	ND	1.0	0.20	
cis-1,2-Dichloroethene	ND	1.0	0.30	
trans-1,2-Dichloroethene	ND	1.0	0.30	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	ND	1.0	0.20	
Methylene chloride	**6.6**	**1.0**	**0.20**	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	ND	1.0	0.20	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	ND	1.0	0.20	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	85	70-130	
1,2-Dichloroethane-d4	85	60-140	
Toluene-d8	106	70-130	

Prēcis
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Analytical Data Report

Client:

Metals

Précis
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Analytical Data Report

Client:

Client Sample ID: PTI-MW3-044
Lab Sample ID: E9G210237-001

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/21/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	ND	0.010	0.0010	1	
Copper	ND	0.025	0.0040	1	

Client Sample ID: PTI-MW11-044
Lab Sample ID: E9G210237-002

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/21/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	ND	0.010	0.0010	1	
Copper	ND	0.025	0.0040	1	

Client Sample ID: PTI-MW6D-044
Lab Sample ID: E9G210237-003

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/21/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	ND	0.010	0.0010	1	
Copper	ND	0.025	0.0040	1	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-EB01-044
Lab Sample ID: E9G210237-004

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/21/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	ND	0.010	0.0010	1	
Copper	ND	0.025	0.0040	1	

Client Sample ID: PTI-MW6B-044
Lab Sample ID: E9G210237-005

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/21/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	ND	0.010	0.0010	1	
Copper	ND	0.025	0.0040	1	

Client Sample ID: PTI-MW7-044
Lab Sample ID: E9G210237-006

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/21/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.010	0.0010	2	G
Chromium	ND	0.020	0.0020	2	G
Copper	**0.068**	**0.050**	**0.0080**	**2**	

Précis
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Analytical Data Report

Client:

Client Sample ID: PTI-MW4A-044
Lab Sample ID: E9G210237-007

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L

Method: 6010B
Preparation: 3005A

Date Sampled: 07/21/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	ND	0.010	0.0010	1	
Copper	ND	0.025	0.0040	1	

Prēcis
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Analytical Data Report

Client:

Classical Chemistry

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-MW3-044
Lab Sample ID: E9G210237-001

Hexavalent Chromium
Hexavalent Chromium

Batch: 9202423
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: PTI-MW3-044
Lab Sample ID: E9G210237-001

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9202422
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**7.3**	**0.10**	**0.0**	**1**	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: **PTI-MW11-044**
Lab Sample ID: E9G210237-002

Hexavalent Chromium
Hexavalent Chromium

Batch: 9202423
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: **PTI-MW11-044**
Lab Sample ID: E9G210237-002

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9202422
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**6.9**	**0.10**	**0.0**	**1**	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: **PTI-MW6D-044**
Lab Sample ID: E9G210237-003

Hexavalent Chromium
Hexavalent Chromium

Batch: 9202423
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: **PTI-MW6D-044**
Lab Sample ID: E9G210237-003

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9202422
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**7.5**	**0.10**	**0.0**	**1**	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: **PTI-EB01-044**
Lab Sample ID: E9G210237-004

Hexavalent Chromium
Hexavalent Chromium

Batch: 9202423
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: **PTI-EB01-044**
Lab Sample ID: E9G210237-004

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9202422
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**5.3**	**0.10**	**0.0**	**1**	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: **PTI-MW6B-044**
Lab Sample ID: E9G210237-005

Hexavalent Chromium
Hexavalent Chromium

Batch: 9202423
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: **PTI-MW6B-044**
Lab Sample ID: E9G210237-005

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9202422
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**7.4**	**0.10**	**0.0**	**1**	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-MW7-044
Lab Sample ID: E9G210237-006

Hexavalent Chromium
Hexavalent Chromium

Batch: 9202423
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: PTI-MW7-044
Lab Sample ID: E9G210237-006

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9202422
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**7.0**	**0.10**	**0.0**	**1**	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-MW4A-044
Lab Sample ID: E9G210237-007

Hexavalent Chromium
Hexavalent Chromium

Batch: 9202423
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: PTI-MW4A-044
Lab Sample ID: E9G210237-007

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9202422
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/21/99
Date Prepared: 07/21/99
Date Analyzed: 07/21/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**7.6**	**0.10**	**0.0**	1	

Quality Control Batch Assignment Report

Lab Sample ID	Matrix	Method	Batch ID	MS Run Number
Metals				
E9G210237-001	WATER	6010B	9204258	9204097
E9G210237-002	WATER	6010B	9204258	9204097
E9G210237-003	WATER	6010B	9204258	9204097
E9G210237-004	WATER	6010B	9204258	9204097
E9G210237-005	WATER	6010B	9204258	9204097
E9G210237-006	WATER	6010B	9204258	9204097
E9G210237-007	WATER	6010B	9204258	9204097
GC/MS Volatiles				
E9G210237-001	WATER	8260B	9203222	9203089
E9G210237-002	WATER	8260B	9203222	9203089
E9G210237-003	WATER	8260B	9203222	9203089
E9G210237-004	WATER	8260B	9203222	9203089
E9G210237-005	WATER	8260B	9203222	9203089
E9G210237-006	WATER	8260B	9203222	9203089
E9G210237-007	WATER	8260B	9203222	9203089
E9G210237-008	WATER	8260B	9203222	9203089
Classical Chemistry				
E9G210237-001	WATER	7196A	9202423	
E9G210237-001		9040B	9202422	
E9G210237-002	WATER	7196A	9202423	
E9G210237-002		9040B	9202422	
E9G210237-003	WATER	7196A	9202423	
E9G210237-003		9040B	9202422	
E9G210237-004	WATER	7196A	9202423	
E9G210237-004		9040B	9202422	
E9G210237-005	WATER	7196A	9202423	
E9G210237-005		9040B	9202422	
E9G210237-006	WATER	7196A	9202423	
E9G210237-006		9040B	9202422	
E9G210237-007	WATER	7196A	9202423	
E9G210237-007		9040B	9202422	

Table of Definitions

Metals

Prēcis
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Quality Control Reports

Batch ID: 9204258
Inductively Coupled Plasma (6010B)

Method Blank

Lab Sample ID: E9G230000-258B
Matrix: Water
Units: mg/L

Analyte	Result	RL	Qual.	Date Analyzed
Cadmium	ND	0.0050		07/26/99
Chromium	ND	0.010		07/26/99
Copper	ND	0.025		07/26/99

Laboratory Control Sample

Lab Sample ID: E9G230000-258C
Matrix: Water
Units: mg/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qual.
Cadmium	0.0500	ND	106	80-120	
Chromium	0.200	ND	109	80-120	
Copper	0.250	ND	102	80-120	

Matrix Spike / Matrix Spike Duplicate

Lab Sample ID E9G210237-002S
Matrix: Water
Units: mg/L

Analyte	Sample Result	Spike Amount	Result MS	Result MSD	% Rec. MS	% Rec. MSD	Control Limits	RPD	Qualifier MS	Qualifier MSD
Cadmium	ND	0.0500	0.0494	0.0511	99	102	80-120	3.4		
Chromium	ND	0.200	0.205	0.213	100	104	80-120	3.6		
Copper	ND	0.250	0.267	0.277	103	107	80-120	3.7		

Classical Chemistry

Prēcis
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Quality Control Reports

Batch ID: 9202423
Hexavalent Chromium

Method Blank

Lab Sample ID: E9G210000-423B
Matrix: Water
Units: mg/L

Analyte	Result	RL	Qual.	Date Analyzed
Hexavalent Chromium	ND	0.020		07/21/99

Laboratory Control Sample

Lab Sample ID: E9G210000-423C
Matrix: Water
Units: mg/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qual.
Hexavalent Chromium	0.0500	0.0544	109	80-120	

Laboratory Control Sample

Lab Sample ID: E9G210000-422C
Matrix: Water
Units: No Units

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qual.
pH	9.18	8.78	96	90-110	

GC/MS Volatiles

Précis
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Quality Control Reports

Batch ID: 9203222

Volatile Organics, GC/MS (8260B)

Method Blank

Lab Sample ID: E9G220000-222B
Matrix: Water
Units: ug/L

Analyte	Result	RL	Qual.	Date Analyzed
Benzene	ND	1.0		07/21/99
Bromodichloromethane	ND	1.0		07/21/99
Bromoform	ND	1.0		07/21/99
Bromomethane	ND	2.0		07/21/99
Carbon tetrachloride	ND	1.0		07/21/99
Chlorobenzene	ND	1.0		07/21/99
Dibromochloromethane	ND	1.0		07/21/99
Chloroethane	ND	2.0		07/21/99
Chloroform	ND	1.0		07/21/99
Chloromethane	ND	2.0		07/21/99
1,2-Dichlorobenzene	ND	1.0		07/21/99
1,3-Dichlorobenzene	ND	1.0		07/21/99
1,4-Dichlorobenzene	ND	1.0		07/21/99
1,1-Dichloroethane	ND	1.0		07/21/99
1,2-Dichloroethane	ND	1.0		07/21/99
1,1-Dichloroethene	ND	1.0		07/21/99
cis-1,2-Dichloroethene	ND	1.0		07/21/99
trans-1,2-Dichloroethene	ND	1.0		07/21/99
1,2-Dichloropropane	ND	1.0		07/21/99
cis-1,3-Dichloropropene	ND	1.0		07/21/99
trans-1,3-Dichloropropene	ND	1.0		07/21/99
Ethylbenzene	ND	1.0		07/21/99
Methylene chloride	ND	1.0		07/21/99
1,1,2,2-Tetrachloroethane	ND	1.0		07/21/99
Tetrachloroethene	ND	1.0		07/21/99
Toluene	ND	1.0		07/21/99
1,1,1-Trichloroethane	ND	1.0		07/21/99
1,1,2-Trichloroethane	ND	1.0		07/21/99
Trichloroethene	ND	1.0		07/21/99
Trichlorofluoromethane	ND	2.0		07/21/99
Vinyl chloride	ND	2.0		07/21/99
m-Xylene & p-Xylene	ND	1.0		07/21/99
o-Xylene	ND	1.0		07/21/99

Batch ID: 9203222

Volatile Organics, GC/MS (8260B)

Method Blank, continued

Lab Sample ID: E9G220000-222B
Matrix: Water
Units: ug/L

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	87	70-130	
1,2-Dichloroethane-d4	82	60-140	
Toluene-d8	109	70-130	

Laboratory Control Sample

Lab Sample ID: E9G220000-222C
Matrix: Water
Units: ug/L

Analyte	Spike Amount	Result	% Rec.	QC Limits	Qual.
Benzene	10.0	10.3	103	70-130	
Chlorobenzene	10.0	9.81	98	70-130	
1,1-Dichloroethene	10.0	9.35	94	60-140	
Toluene	10.0	10.3	103	70-130	
Trichloroethene	10.0	9.51	95	70-130	
Surrogate					
Bromofluorobenzene	10.0	9.70	97	70-130	
1,2-Dichloroethane-d4	10.0	9.44	94	60-140	
Toluene-d8	10.0	11.5	115	70-130	

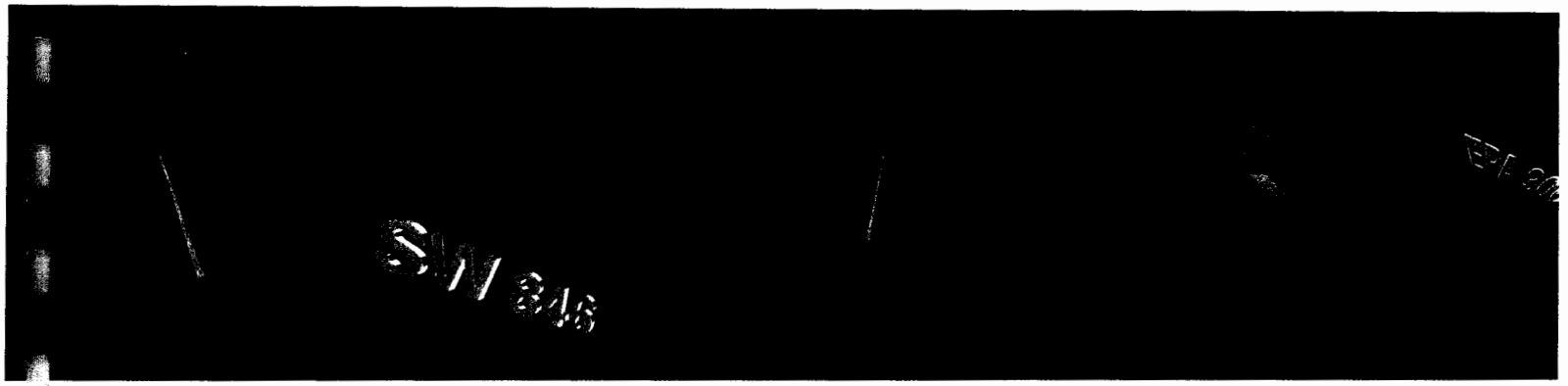
Batch ID: 9203222

Volatile Organics, GC/MS (8260B)

Matrix Spike / Matrix Spike Duplicate

Lab Sample ID E9G210237-007S
Matrix: Water
Units: ug/L

Analyte	Sample Result	Spike Amount	Result MS	Result MSD	% Rec. MS	% Rec. MSD	Control Limits	RPD	Qualifier MS	Qualifier MSD
Benzene	ND	10.0	9.68	9.61	97	96	70-130	0.72		
Chlorobenzene	ND	10.0	9.44	9.44	94	94	70-130	0.0		
1,1-Dichloroethene	ND	10.0	9.79	10.1	92	95	60-140	3.5		
Toluene	ND	10.0	9.52	9.41	95	94	70-130	1.2		
Trichloroethene	5.2	10.0	14.9	15.3	96	101	70-130	2.9		
Surrogate										
Bromofluorobenzene	8.3	10.0	9.54	9.32	95	93	70-130			
1,2-Dichloroethane-d4	8.9	10.0	10.2	10.3	102	103	60-140			
Toluene-d8	10	10.0	10.5	10.2	105	102	70-130			



Precis
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Quanterra
1721 South Grand Ave.
Santa Ana, CA 92705

Tel (714) 258-8610
Fax (714) 258-0921

July 28, 1999

QUANTERRA INCORPORATED LOT NUMBER: E9G220269
PO/CONTRACT: 2279-11462-111.FLD

Ed Vigil
Phibro Tech, Inc.
8851 Dice Road
Santa Fe Springs, CA 90670

Dear Mr. Vigil,

This report contains the analytical results for the ten samples received under chain of custody by Quanterra Incorporated on July 22, 1999. These samples are associated with your PTI - Santa Fe Springs Quarterly project.

All applicable quality control procedures met method-specified acceptance criteria.

This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions, please feel free to call me at 714-258-8610.

Sincerely,

Diane Suzuki
Project Manager

CC: Project File
Sharon Wallin, Camp Dresser & McKee, Inc.

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Laboratory/Client Sample Cross-Reference

Lab Sample ID	Client Sample ID	Date	Matrix
E9G220269-001	PTI-MW35-044	07/22/99	Water
E9G220269-002	PTI-MW4-044	07/22/99	Water
E9G220269-003	PTI-MW14S-044	07/22/99	Water
E9G220269-004	PTI-MW15S-044	07/22/99	Water
E9G220269-005	PTI-MW15D-044	07/22/99	Water
E9G220269-006	PTI-MW16-044	07/22/99	Water
E9G220269-007	PTI-EB02-044	07/22/99	Water
E9G220269-008	PTI-MW37-044	07/22/99	Water
E9G220269-009	PTI-MW09-044	07/22/99	Water
E9G220269-010	PTI-TB03-044	07/22/99	Water

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Analytical Data Report

Client:

GC/MS Volatiles

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Analytical Data Report

Client:

Client Sample ID: PTI-MW35-044
Lab Sample ID: E9G220269-001

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9204432
Matrix: Water
Units: ug/L
Dil. Factor: 10
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/23/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	10	3.0	
Bromodichloromethane	ND	10	2.0	
Bromoform	ND	10	3.0	
Bromomethane	ND	20	5.0	
Carbon tetrachloride	ND	10	3.0	
Chlorobenzene	ND	10	3.0	
Dibromochloromethane	ND	10	2.0	
Chloroethane	ND	20	3.0	
Chloroform	**11**	**10**	**2.0**	
Chloromethane	ND	20	3.0	
1,2-Dichlorobenzene	ND	10	2.0	
1,3-Dichlorobenzene	ND	10	2.0	
1,4-Dichlorobenzene	ND	10	3.0	
1,1-Dichloroethane	**68**	**10**	**2.0**	
1,2-Dichloroethane	**77**	**10**	**2.0**	
1,1-Dichloroethene	**42**	**10**	**2.0**	
cis-1,2-Dichloroethene	**120**	**10**	**3.0**	
trans-1,2-Dichloroethene	ND	10	2.0	
1,2-Dichloropropane	ND	10	2.0	
cis-1,3-Dichloropropene	ND	10	2.0	
trans-1,3-Dichloropropene	ND	10	2.0	
Ethylbenzene	**550**	**10**	**2.0**	
Methylene chloride	**46**	**10**	**2.0**	
1,1,2,2-Tetrachloroethane	ND	10	3.0	
Tetrachloroethene	**12**	**10**	**2.0**	
Toluene	ND	10	2.0	
1,1,1-Trichloroethane	ND	10	2.0	
1,1,2-Trichloroethane	ND	10	2.0	
Trichloroethene	**150**	**10**	**2.0**	
Trichlorofluoromethane	ND	20	2.0	
Vinyl chloride	ND	20	3.0	
m-Xylene & p-Xylene	**49**	**10**	**5.0**	
o-Xylene	**11**	**10**	**2.0**	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	91	70-130	
1,2-Dichloroethane-d4	107	60-140	
Toluene-d8	102	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-MW4-044
Lab Sample ID: E9G220269-002

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9204432
Matrix: Water
Units: ug/L
Dil. Factor: 10
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/23/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	10	3.0	
Bromodichloromethane	ND	10	2.0	
Bromoform	ND	10	3.0	
Bromomethane	ND	20	5.0	
Carbon tetrachloride	ND	10	3.0	
Chlorobenzene	ND	10	3.0	
Dibromochloromethane	ND	10	2.0	
Chloroethane	ND	20	3.0	
Chloroform	ND	10	2.0	
Chloromethane	ND	20	3.0	
1,2-Dichlorobenzene	ND	10	2.0	
1,3-Dichlorobenzene	ND	10	2.0	
1,4-Dichlorobenzene	ND	10	3.0	
1,1-Dichloroethane	**58**	**10**	**2.0**	
1,2-Dichloroethane	**87**	**10**	**2.0**	
1,1-Dichloroethene	**36**	**10**	**2.0**	
cis-1,2-Dichloroethene	**100**	**10**	**3.0**	
trans-1,2-Dichloroethene	ND	10	2.0	
1,2-Dichloropropane	ND	10	2.0	
cis-1,3-Dichloropropene	ND	10	2.0	
trans-1,3-Dichloropropene	ND	10	2.0	
Ethylbenzene	**670**	**10**	**2.0**	
Methylene chloride	**38**	**10**	**2.0**	
1,1,2,2-Tetrachloroethane	ND	10	3.0	
Tetrachloroethene	ND	10	2.0	
Toluene	ND	10	2.0	
1,1,1-Trichloroethane	ND	10	2.0	
1,1,2-Trichloroethane	ND	10	2.0	
Trichloroethene	**140**	**10**	**2.0**	
Trichlorofluoromethane	ND	20	2.0	
Vinyl chloride	ND	20	3.0	
m-Xylene & p-Xylene	**54**	**10**	**5.0**	
o-Xylene	**13**	**10**	**2.0**	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	98	70-130	
1,2-Dichloroethane-d4	115	60-140	
Toluene-d8	107	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-MW14S-044
Lab Sample ID: E9G220269-003

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9204432
Matrix: Water
Units: ug/L
Dil. Factor: 50
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/23/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	50	15	
Bromodichloromethane	ND	50	10	
Bromoform	ND	50	15	
Bromomethane	ND	100	25	
Carbon tetrachloride	ND	50	15	
Chlorobenzene	ND	50	15	
Dibromochloromethane	ND	50	10	
Chloroethane	ND	100	15	
Chloroform	ND	50	10	
Chloromethane	ND	100	15	
1,2-Dichlorobenzene	ND	50	10	
1,3-Dichlorobenzene	ND	50	10	
1,4-Dichlorobenzene	ND	50	15	
1,1-Dichloroethane	ND	50	10	
1,2-Dichloroethane	ND	50	10	
1,1-Dichloroethene	ND	50	10	
cis-1,2-Dichloroethene	ND	50	15	
trans-1,2-Dichloroethene	ND	50	10	
1,2-Dichloropropane	ND	50	10	
cis-1,3-Dichloropropene	ND	50	10	
trans-1,3-Dichloropropene	ND	50	10	
Ethylbenzene	**3000**	**50**	**10**	
Methylene chloride	ND	50	10	
1,1,2,2-Tetrachloroethane	ND	50	15	
Tetrachloroethene	ND	50	10	
Toluene	ND	50	10	
1,1,1-Trichloroethane	ND	50	10	
1,1,2-Trichloroethane	ND	50	10	
Trichloroethene	**74**	**50**	**10**	
Trichlorofluoromethane	ND	100	10	
Vinyl chloride	ND	100	15	
m-Xylene & p-Xylene	ND	50	25	
o-Xylene	ND	50	10	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	90	70-130	
1,2-Dichloroethane-d4	105	60-140	
Toluene-d8	97	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-MW15S-044
Lab Sample ID: E9G220269-004

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9204432
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	**2.5**	**1.0**	**0.30**	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	**4.2**	**1.0**	**0.20**	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	ND	1.0	0.20	
1,2-Dichloroethane	**34**	**1.0**	**0.20**	
1,1-Dichloroethene	ND	1.0	0.20	
cis-1,2-Dichloroethene	ND	1.0	0.30	
trans-1,2-Dichloroethene	ND	1.0	0.20	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	**29**	**1.0**	**0.20**	
Methylene chloride	ND	1.0	0.20	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	**6.1**	**1.0**	**0.20**	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	**3.9**	**1.0**	**0.20**	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	**23**	**1.0**	**0.50**	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	94	70-130	
1,2-Dichloroethane-d4	123	60-140	
Toluene-d8	99	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-MW15D-044
Lab Sample ID: E9G220269-005

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9204432
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/23/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	ND	1.0	0.30	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	ND	1.0	0.20	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	ND	1.0	0.20	
1,2-Dichloroethane	ND	1.0	0.20	
1,1-Dichloroethene	**1.1**	**1.0**	**0.20**	
cis-1,2-Dichloroethene	ND	1.0	0.30	
trans-1,2-Dichloroethene	ND	1.0	0.20	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	**34**	**1.0**	**0.20**	
Methylene chloride	ND	1.0	0.20	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	**13**	**1.0**	**0.20**	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	**9.0**	**1.0**	**0.20**	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	91	70-130	
1,2-Dichloroethane-d4	103	60-140	
Toluene-d8	100	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-MW16-044
Lab Sample ID: E9G220269-006

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9204432
Matrix: Water
Units: ug/L
Dil. Factor: 2
Method: 8260B
Preparation: 5030B/8260B

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/23/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	2.0	0.60	
Bromodichloromethane	ND	2.0	0.40	
Bromoform	ND	2.0	0.60	
Bromomethane	ND	4.0	1.0	
Carbon tetrachloride	ND	2.0	0.60	
Chlorobenzene	ND	2.0	0.60	
Dibromochloromethane	ND	2.0	0.40	
Chloroethane	ND	4.0	0.60	
Chloroform	ND	2.0	0.40	
Chloromethane	ND	4.0	0.60	
1,2-Dichlorobenzene	ND	2.0	0.40	
1,3-Dichlorobenzene	ND	2.0	0.40	
1,4-Dichlorobenzene	ND	2.0	0.60	
1,1-Dichloroethane	**130**	**2.0**	**0.40**	
1,2-Dichloroethane	**26**	**2.0**	**0.40**	
1,1-Dichloroethene	**13**	**2.0**	**0.40**	
cis-1,2-Dichloroethene	**12**	**2.0**	**0.60**	
trans-1,2-Dichloroethene	**3.2**	**2.0**	**0.40**	
1,2-Dichloropropane	ND	2.0	0.40	
cis-1,3-Dichloropropene	ND	2.0	0.40	
trans-1,3-Dichloropropene	ND	2.0	0.40	
Ethylbenzene	**33**	**2.0**	**0.40**	
Methylene chloride	ND	2.0	0.40	
1,1,2,2-Tetrachloroethane	ND	2.0	0.60	
Tetrachloroethene	**22**	**2.0**	**0.40**	
Toluene	ND	2.0	0.40	
1,1,1-Trichloroethane	ND	2.0	0.40	
1,1,2-Trichloroethane	ND	2.0	0.40	
Trichloroethene	**29**	**2.0**	**0.40**	
Trichlorofluoromethane	ND	4.0	0.40	
Vinyl chloride	ND	4.0	0.60	
m-Xylene & p-Xylene	ND	2.0	1.0	
o-Xylene	ND	2.0	0.40	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	93	70-130	
1,2-Dichloroethane-d4	113	60-140	
Toluene-d8	101	70-130	

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Analytical Data Report

Client:

Client Sample ID: PTI-EB02-044
Lab Sample ID: E9G220269-007

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9204432
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	ND	1.0	0.30	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	ND	1.0	0.20	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	ND	1.0	0.20	
1,2-Dichloroethane	ND	1.0	0.20	
1,1-Dichloroethene	ND	1.0	0.20	
cis-1,2-Dichloroethene	ND	1.0	0.30	
trans-1,2-Dichloroethene	ND	1.0	0.20	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	ND	1.0	0.20	
Methylene chloride	ND	1.0	0.20	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	ND	1.0	0.20	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	ND	1.0	0.20	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	93	70-130	
1,2-Dichloroethane-d4	97	60-140	
Toluene-d8	103	70-130	

Précis
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Analytical Data Report

Client:

Client Sample ID: PTI-MW37-044
Lab Sample ID: E9G220269-008

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9204432
Matrix: Water
Units: ug/L
Dil. Factor: 25
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/23/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	25	7.5	
Bromodichloromethane	ND	25	5.0	
Bromoform	ND	25	7.5	
Bromomethane	ND	50	12	
Carbon tetrachloride	ND	25	7.5	
Chlorobenzene	ND	25	7.5	
Dibromochloromethane	ND	25	5.0	
Chloroethane	ND	50	7.5	
Chloroform	**490**	**25**	**5.0**	
Chloromethane	ND	50	7.5	
1,2-Dichlorobenzene	ND	25	5.0	
1,3-Dichlorobenzene	ND	25	5.0	
1,4-Dichlorobenzene	ND	25	7.5	
1,1-Dichloroethane	**770**	**25**	**5.0**	
1,2-Dichloroethane	**150**	**25**	**5.0**	
1,1-Dichloroethene	**200**	**25**	**5.0**	
cis-1,2-Dichloroethene	**51**	**25**	**7.5**	
trans-1,2-Dichloroethene	ND	25	5.0	
1,2-Dichloropropane	ND	25	5.0	
cis-1,3-Dichloropropene	ND	25	5.0	
trans-1,3-Dichloropropene	ND	25	5.0	
Ethylbenzene	ND	25	5.0	
Methylene chloride	**1300**	**25**	**5.0**	
1,1,2,2-Tetrachloroethane	ND	25	7.5	
Tetrachloroethene	ND	25	5.0	
Toluene	ND	25	5.0	
1,1,1-Trichloroethane	**45**	**25**	**5.0**	
1,1,2-Trichloroethane	ND	25	5.0	
Trichloroethene	**860**	**25**	**5.0**	
Trichlorofluoromethane	ND	50	5.0	
Vinyl chloride	ND	50	7.5	
m-Xylene & p-Xylene	ND	25	12	
o-Xylene	ND	25	5.0	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	87	70-130	
1,2-Dichloroethane-d4	109	60-140	
Toluene-d8	99	70-130	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-MW09-044
Lab Sample ID: E9G220269-009

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9207345
Matrix: Water
Units: ug/L
Dil. Factor: 25
Method: 8260B
Preparation: 5030B/8260B

Date Sampled: 07/22/99
Date Prepared: 07/23/99
Date Analyzed: 07/23/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	25	7.5	
Bromodichloromethane	ND	25	5.0	
Bromoform	ND	25	7.5	
Bromomethane	ND	50	12	
Carbon tetrachloride	ND	25	7.5	
Chlorobenzene	ND	25	7.5	
Dibromochloromethane	ND	25	5.0	
Chloroethane	ND	50	7.5	
Chloroform	**440**	**25**	**5.0**	
Chloromethane	ND	50	7.5	
1,2-Dichlorobenzene	ND	25	5.0	
1,3-Dichlorobenzene	ND	25	5.0	
1,4-Dichlorobenzene	ND	25	7.5	
1,1-Dichloroethane	**780**	**25**	**5.0**	
1,2-Dichloroethane	**140**	**25**	**5.0**	
1,1-Dichloroethene	**190**	**25**	**5.0**	
cis-1,2-Dichloroethene	**50**	**25**	**7.5**	
trans-1,2-Dichloroethene	ND	25	5.0	
1,2-Dichloropropane	ND	25	5.0	
cis-1,3-Dichloropropene	ND	25	5.0	
trans-1,3-Dichloropropene	ND	25	5.0	
Ethylbenzene	ND	25	5.0	
Methylene chloride	**1400**	**25**	**5.0**	
1,1,2,2-Tetrachloroethane	ND	25	7.5	
Tetrachloroethene	ND	25	5.0	
Toluene	ND	25	5.0	
1,1,1-Trichloroethane	ND	25	5.0	
1,1,2-Trichloroethane	ND	25	5.0	
Trichloroethene	**810**	**25**	**5.0**	
Trichlorofluoromethane	ND	50	5.0	
Vinyl chloride	ND	50	7.5	
m-Xylene & p-Xylene	ND	25	12	
o-Xylene	ND	25	5.0	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	91	70-130	
1,2-Dichloroethane-d4	109	60-140	
Toluene-d8	100	70-130	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-TB03-044
Lab Sample ID: E9G220269-010

Volatile Organics, GC/MS (8260B)
25 mL Purge-and-Trap

Batch: 9204432
Matrix: Water
Units: ug/L
Dil. Factor: 1
Method: 8260B
Preparation: 5030B/8260B
Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Qualifier
Benzene	ND	1.0	0.30	
Bromodichloromethane	ND	1.0	0.20	
Bromoform	ND	1.0	0.30	
Bromomethane	ND	2.0	0.50	
Carbon tetrachloride	ND	1.0	0.30	
Chlorobenzene	ND	1.0	0.30	
Dibromochloromethane	ND	1.0	0.20	
Chloroethane	ND	2.0	0.30	
Chloroform	ND	1.0	0.20	
Chloromethane	ND	2.0	0.30	
1,2-Dichlorobenzene	ND	1.0	0.20	
1,3-Dichlorobenzene	ND	1.0	0.20	
1,4-Dichlorobenzene	ND	1.0	0.30	
1,1-Dichloroethane	ND	1.0	0.20	
1,2-Dichloroethane	ND	1.0	0.20	
1,1-Dichloroethene	ND	1.0	0.20	
cis-1,2-Dichloroethene	ND	1.0	0.30	
trans-1,2-Dichloroethene	ND	1.0	0.20	
1,2-Dichloropropane	ND	1.0	0.20	
cis-1,3-Dichloropropene	ND	1.0	0.20	
trans-1,3-Dichloropropene	ND	1.0	0.20	
Ethylbenzene	ND	1.0	0.20	
Methylene chloride	**6.5**	**1.0**	**0.20**	
1,1,2,2-Tetrachloroethane	ND	1.0	0.30	
Tetrachloroethene	ND	1.0	0.20	
Toluene	ND	1.0	0.20	
1,1,1-Trichloroethane	ND	1.0	0.20	
1,1,2-Trichloroethane	ND	1.0	0.20	
Trichloroethene	ND	1.0	0.20	
Trichlorofluoromethane	ND	2.0	0.20	
Vinyl chloride	ND	2.0	0.30	
m-Xylene & p-Xylene	ND	1.0	0.50	
o-Xylene	ND	1.0	0.20	

Surrogate	% Rec.	Acceptance Limit	Qualifier
Bromofluorobenzene	95	70-130	
1,2-Dichloroethane-d4	104	60-140	
Toluene-d8	106	70-130	

Prēcis
A Quanterra Product

Analytical Data Report

Client:

Metals

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-MW35-044
Lab Sample ID: E9G220269-001

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/22/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	**0.42**	**0.010**	**0.0010**	**2**	
Chromium	**50.6**	**0.020**	**0.0020**	**2**	
Copper	ND	0.050	0.0080	2	G

Client Sample ID: PTI-MW4-044
Lab Sample ID: E9G220269-002

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/22/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	**0.42**	**0.010**	**0.0010**	**2**	
Chromium	**49.7**	**0.020**	**0.0020**	**2**	
Copper	ND	0.050	0.0080	2	G

Client Sample ID: PTI-MW14S-044
Lab Sample ID: E9G220269-003

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/22/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	**0.038**	**0.010**	**0.0010**	**1**	
Copper	**0.037**	**0.025**	**0.0040**	**1**	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-MW15S-044
Lab Sample ID: E9G220269-004

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/22/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	**0.010**	**0.010**	**0.0010**	**1**	
Copper	ND	0.025	0.0040	1	

Client Sample ID: PTI-MW15D-044
Lab Sample ID: E9G220269-005

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/22/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	ND	0.010	0.0010	1	
Copper	ND	0.025	0.0040	1	

Client Sample ID: PTI-MW16-044
Lab Sample ID: E9G220269-006

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/22/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	ND	0.010	0.0010	1	
Copper	ND	0.025	0.0040	1	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-EB02-044
Lab Sample ID: E9G220269-007

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/22/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.0050	0.00050	1	
Chromium	ND	0.010	0.0010	1	
Copper	ND	0.025	0.0040	1	

Client Sample ID: PTI-MW37-044
Lab Sample ID: E9G220269-008

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/22/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.010	0.0010	2	G
Chromium	**5.5**	**0.020**	**0.0020**	**2**	
Copper	ND	0.050	0.0080	2	G

Client Sample ID: PTI-MW09-044
Lab Sample ID: E9G220269-009

Inductively Coupled Plasma (6010B)
Acid Digestion for Total Recoverable Metals

Batch: 9204258
Matrix: Water
Units: mg/L
Method: 6010B
Preparation: 3005A
Date Sampled: 07/22/99
Date Prepared: 07/23/99
Date Analyzed: 07/26/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Cadmium	ND	0.010	0.0010	2	G
Chromium	**5.6**	**0.020**	**0.0020**	**2**	
Copper	ND	0.050	0.0080	2	G

Précis
A Quanterra Product

Analytical Data Report

Client:

Classical Chemistry

Precis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-MW35-044
Lab Sample ID: E9G220269-001

Hexavalent Chromium
Hexavalent Chromium

Batch: 9203459
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	48.5	20.0	10.0	1000	

Client Sample ID: PTI-MW35-044
Lab Sample ID: E9G220269-001

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9203458
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	6.9	0.10	0.0	1	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-MW4-044
Lab Sample ID: E9G220269-002

Hexavalent Chromium
Hexavalent Chromium

Batch: 9203459
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	41.1	20.0	10.0	1000	

Client Sample ID: PTI-MW4-044
Lab Sample ID: E9G220269-002

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9203458
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	6.9	0.10	0.0	1	

Prēcis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: **PTI-MW14S-044**
Lab Sample ID: E9G220269-003

Hexavalent Chromium
Hexavalent Chromium

Batch: 9203459
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: **PTI-MW14S-044**
Lab Sample ID: E9G220269-003

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9203458
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**7.4**	**0.10**	**0.0**	**1**	

Prēcis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: **PTI-MW15S-044**
Lab Sample ID: E9G220269-004

Hexavalent Chromium
Hexavalent Chromium

Batch: 9203459
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: **PTI-MW15S-044**
Lab Sample ID: E9G220269-004

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9203458
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**7.6**	**0.10**	**0.0**	**1**	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-MW15D-044
Lab Sample ID: E9G220269-005

Hexavalent Chromium
Hexavalent Chromium

Batch: 9203459
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: PTI-MW15D-044
Lab Sample ID: E9G220269-005

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9203458
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**7.5**	**0.10**	**0.0**	**1**	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: **PTI-MW16-044**
Lab Sample ID: E9G220269-006

Hexavalent Chromium
Hexavalent Chromium

Batch: 9203459
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: **PTI-MW16-044**
Lab Sample ID: E9G220269-006

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9203458
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**7.0**	**0.10**	**0.0**	**1**	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: **PTI-EB02-044**
Lab Sample ID: E9G220269-007

Hexavalent Chromium
Hexavalent Chromium

Batch: 9203459
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	ND	0.020	0.010	1	

Client Sample ID: **PTI-EB02-044**
Lab Sample ID: E9G220269-007

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9203458
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	**5.7**	**0.10**	**0.0**	**1**	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-MW37-044
Lab Sample ID: E9G220269-008

Hexavalent Chromium
Hexavalent Chromium

Batch: 9203459
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	6.0	2.0	1.0	100	

Client Sample ID: PTI-MW37-044
Lab Sample ID: E9G220269-008

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9203458
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	6.6	0.10	0.0	1	

Précis
A Quanterra Product

Analytical Data Report

Client:

Client Sample ID: PTI-MW09-044
Lab Sample ID: E9G220269-009

Hexavalent Chromium
Hexavalent Chromium

Batch: 9203459
Matrix: Water
Units: mg/L

Method: 7196A
Preparation: 7196A

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
Hexavalent Chromium	5.8	2.0	1.0	100	

Client Sample ID: PTI-MW09-044
Lab Sample ID: E9G220269-009

pH (9040B) - Aqueous
pH - Aqueous

Batch: 9203458
Matrix: Water
Units: No Units

Method: 9040B
Preparation: 9040B

Date Sampled: 07/22/99
Date Prepared: 07/22/99
Date Analyzed: 07/22/99

Analyte	Result	RL	MDL	Dil. Factor	Qualifier
pH	6.6	0.10	0.0	1	

Appendix C
Completed COC Forms

MICROSEEPS, Inc.

220 William Pitt Way, Pittsburgh, PA 15238

Phone: (412) 826-5245 Fax: (412) 826-3433

CHAIN-OF-CUSTODY RECORD

Company Name: CDM

Address: 18881 Von Karman Ave Suite 650

Proj. Manager: S. Wallin

Proj. Location: PTI

Proj. Number: 2279-114602-111. FLD

Phone # : 949-752-5452 Fax # :

Sampler's signature :

Note: Enter proper letters in Requested Analyses columns below.

Analysis Options Note: If analysis D,E,or K is selected, scratch (option) NOT wanted.

* A	C1 -C4	G	Chlorinated HC
* B	Hydrogen & Helium	H	BTEX
* C	Permanent Gases (CH4, CO, CO2, N2, O2)	J	BTEX & C5 - C10
D	Mercury (Soil) or (Air **)	K	TPH (C5 - C10) or (C4 -C12)
E	TO-14 by GC/MS (Ambient) or (Source **)	L	C11 - C18
F	601 & 602 Compounds	Other	Specify below.

* An additional 22 ml vial of sample is required when requested in combination with another analysis.

** Available upon request.

Collection Date	Collection Time	Number of Containers	"Summa" # if Can. used	Sample Type	Sample Identification	Requested Analyses (Other)	Remarks
7-20-99	13:30	3 ~~3/4~~	40 ml	water	PTI-MW15-044	8260 VOC	
	14:30	3	40 ml		PTI-MW1D-044	" "	
	13:30	1	500 poly		PTI-MW15-044	Metal Cd Co Cr	← please filter in lab
	14:30	1			PTI-MW1D-044	" "	" "
	13:30	1			PTI-MW15-044	Cr^{+6} pH	
	14:30	1			PTI-MW1D-044	" "	

~~Results to~~ : comments: per Rob Lopez TTIP Blank = PTI-TB01-044

Invoice to :

Relinquished by	Company	Date	Time	Received by	Company	Date	Time
	CDM	7-20-99	15:15		Q-SA	7/20/99	17:02
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Laboratory to return. YELLOW COPY : Laboratory PINK COPY : Submitter

QUANTERRA INC. - SANTA ANA
PROJECT RECEIPT CHECKLIST

Date: 7/20/99

Quantims Lot #: E9G200220 | Quote #: 29756

Client Name: PHIBROTECH | Project:

Received by: R-MARTIN | Date/Time Received: 7/20 1700

Delivered by : ☐Client ☐Airborne ☐Fed Ex ☐DHL ☐Ultra-Ex ☐Rey B.
☐UPS ☐ATD ☑Other Dependable

Initial / Date

Custody Seal Status: ☐Intact ☐Broken ☑None ..... RW 7/20

Custody Seal #(s): ☐No Seal # .....

Sample Container(s): ☑Quanterra ☐Client ☐N/A .....

Temperature(s) (COOLER/BLANK) in °C: 6.0 (CORRECTED TEMP).....

Thermometer Used : ☑IR (Infra-red) ☐Digital (Probe) .....

Samples: ☑Intact ☐Broken ☐Other .....

Anomalies: ☑No ☐Yes (See Clouseau) .....

Labeled by .....

Labeling checked by .....

Short-Hold Notification: ☐Ph ☑Wet Chem ☐Metals (Filter/Pres) ☐Encore ☐N/A ...

Outside Analysis(es) (Test/Lab/Date Sent Out) :

N/A .....

.....

.....

.....

********** LEAVE NO BLANK SPACES ; USE N/A **********

Fraction	-1	-2									PH
VOAh /*	3	3									N/A
500 PB	1										N/A
250 PB		1									N/A
500 PBn	(1)	1							lab preserved		
	↓ lab filtered										

h:HCl s:H2SO4 na:Sodium Hydroxide znna: Sodium Hydroxide + Zinc Acetate n:HNO3 n/f:HNO3 field filtered
* Number VOA's w/ air bubbles present n/f/l:HNO3 Lab filtered

LOGGED BY/DATE: RW 7/20/99 REVIEWED BY/DATE:

PRC Ver. 4 021599

* NO COC WAS Received
INFO. BASED ON CONTAINER LABELS

Chain of Custody Record

Quanterra

QUA-4124

Client	Project Manager	Date	Chain Of Custody Number
CDM	S. Wallin	7-21-99	22350
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 2**
18881 Von Karman Ave Suite 650	949 752-5452		
City / **State** / **Zip Code**	**Site Contact**		
Irvine / Ca	R. LoPuz		
Project Name	**Carrier/Waybill Number**		
PTI			
Contract/Purchase Order/Quote No.			
2279-11462.111.FLD			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: 8260 VOC	Analysis: Cr+6 & pH	Analysis: Cr Cd
PTI-MW3-044	7-21-99	8:30	water	(3 40ml	VOA	3	HCl		X		
" "				500 ml	poly	1	None			X	
" "		↓		500 ml	poly	1	HNO_3				X
PTI-MW11-044		9:35		(" "	VOA	3	(" "		X		
" "		↓			poly	1				X	
" "					poly	1					X
PTI-MW6D-044		10:55		(" "	VOA	3	(" "		X		
" "		↓			poly	1				X	
" "					poly	1					X
PTI-EB01-044		11:00		(" "	VOA	3	(" "		X		
" "		↓			poly	1				X	
" "					poly	1					X
PTI-MW6B-044		11:35		(" "	VOA	3	(" "		X		
" "		↓			poly	1				X	
" "	↓	↓	↓		poly	1					X

Special Instructions

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required
☒ Normal ☐ Rush

QC Level ☐ I. ☐ II. ☐ III.

Project Specific (Specify)

	Date	Time		Date	Time
1. ~~Relinquished By~~	7-21-99	15:30	1. Received By: Clay E. Essex	7-21-99	1530
2. Relinquished By: Clay E. Essex	7-21-99	1620	2. Received By: Carolyn Hunt	7/21/99	1620
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

Quanterra

QUA-4124

Client	Project Manager	Date	Chain Of Custody Number
CDM	S. Wallin	7-21-99	22352
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 2 of 2**
18881 Von Karman Ave Suite	949-752 5452		
City / **State** / **Zip Code**	**Site Contact**		
Irvine / / 650	T2. LOPEZ		
Project Name	**Carrier/Waybill Number**		
PTI			
Contract/Purchase Order/Quote No.			
2279-11462-111-FLD			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: 8260 VOC	Cr 6+ & pH	Cr CD
PTI-MW7-044	7-21-99	13:45	Water	120ml	VOA	3	HCl		X		
" "	↓	↓	↓	500ml	poly	1	NaOH			X	
" "	↓	↓	↓	500ml	poly	1	HNO_3				V
~~MW~~ PTI-MW4A-044	7-21-99	15:20		(")	(" ")	3	(" ")		X		
" "	↓	↓	↓			1				X	
" "	↓	↓	↓			1					X
Trip Blank	—	—	—	~~60~~ 80	VOA	2	HCl		X		

Special Instructions TB = PTI-TB02-044 per Rob Lopez

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required
☒ Normal ☐ Rush

QC Level
☐ I. ☐ II. ☐ III.

Project Specific (Specify)

	Relinquished By	Date	Time	Received By	Date	Time
1.	[signature]	7-21-99	15:30	Clay E. Essex	7-21-99	1530
2.	Clay E. Essex	7-21-99	1620	[signature]	7/21/99	1620
3.						

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

QUANTERRA INC. - SANTA ANA
PROJECT RECEIPT CHECKLIST

Date: 7/21/99

Quantims Lot #: EGG210237 Quote #: 29756

Client Name: CDM Project: PTT

Received by: MARTIN Date/Time Received:

Delivered by : ☐Client ☐Airborne ☐Fed Ex ☐DHL ☐Ultra-Ex ☐Rey B.
☐UPS ☐ATD ☑Other Dependable

Initial / Date

Custody Seal Status: ☐Intact ☐Broken ☑None ..... RW 7/21

Custody Seal #(s): ☑No Seal # .....

Sample Container(s): ☑Quanterra ☐Client ☐N/A .....

Temperature(s) (COOLER/BLANK) in °C: 6° (CORRECTED TEMP).....

Thermometer Used : ☑IR (Infra-red) ☐Digital (Probe) .....

Samples: ☑Intact ☐Broken ☐Other .....

Anomalies: ☑No ☐Yes (See Clouseau) .....

Labeled by .....

Labeling checked by .....

Short-Hold Notification: ☐Ph ☑Wet Chem ☐Metals (Filter/Pres) ☐Encore ☐N/A ...

Outside Analysis(es) (Test/Lab/Date Sent Out) :

N/A

********** LEAVE NO BLANK SPACES ; USE N/A **********

Fraction	17	-8									PH
VOAh /*	3	2									N/A
500 PB	1	Ø									N/A
500PBn	1	Ø									<2

h:HCl s:H2SO4 na:Sodium Hydroxide znna: Sodium Hydroxide + Zinc Acetate n:HNO3 n/f:HNO3 field filtered
* Number VOA's w/ air bubbles present n/f/l:HNO3 Lab filtered

LOGGED BY/DATE: RW 7/21/99 REVIEWED BY/DATE:

PRC Ver. 4 021599

C010418

Quanterra Environmental Services

Quanterra - Santa Ana
Condition Upon Receipt Anomaly Report (CUR)

Client: CDM **Date/Time** 7/21/99 17:00

LIMS No: EGG210237 **Initiated by:**

Affected samples		Chain of Custody #
Client ID	**Lab ID**	**Analyses Requested**
	-001 to	METALS
	-007	

CONDITION/ANOMALY/VARIANCE (CHECK ALL THAT APPLY):

- **COOLERS**
  - ☐ Not Received, No (COC)
  - ☐ Not Received but COC (s) Available
  - ☐ Leaking
  - ☐ Other: _____
- **TEMPERATURE (SPECS 4 ± 2°C)**
  - ☐ Cooler Temp(s) _____
  - ☐ Temperature Blank(s) _____
- **CONTAINERS**
  - ☐ Leaking
  - ☐ Broken
  - ☐ Extra
  - ☐ Without Labels
  - ☐ VOA Vials with Headspace _____ mm
  - ☐ Other: _____
- **SAMPLES**
  - ☐ Samples NOT RECEIVED but listed on COC
  - ☐ Samples received but NOT LISTED on COC
  - ☐ Logged based on Label Information
  - ☐ Logged based on info from other samples on COC
  - ☐ Logged according to Work Plan
  - ☐ Logged on HOLD UNTIL FURTHER NOTICE
  - ☐ Other _____

- **CUSTODY SEALS (COOLER(S)/CONTAINER(S)**
  - ☐ None
  - ☐ Not Intact
  - ☐ Other _____
- **CHAIN OF CUSTODY (COC)**
  - ☐ Not relinquished by Client; No date/time relinquished
  - ☒ Incomplete information provided Dissolve or Total ?
  - ☐ Other _____
- **CONTAINERS LABELS**
  - ☐ Not the same ID/info as in COC
  - ☐ Incomplete Information
    - ☐ Preservative
    - ☐ Collection _____ Time _____ Date
  - ☐ Markings/Info illegible
  - ☐ Torn
  - ☐ Other _____
- ☐ Will be noted on COC Client to send samples with new COC
- ☐ Mislabeled as to tests, preservatives, etc.
- ☐ Holding time expired
- ☐ Improper container used
- ☐ Not preserved/Improper preservative used
- ☐ Improper pH _____ Lab to preserve sample and document
- ☐ Insufficient quantities for analysis

Comments Informed PM. Metal Analyses put on Hold

Corrective Action Implemented:

☒ Client Informed: verbally on _____ By: _____ In writing on 7/22 By: _____

☐ ~~Sample(s) processed "as is."~~ As discussed per Sharon Walker

☐ Sample(s) on hold until: _____ If released, notify: _____

Sample Control Supervisor Review: _____ **Date:** _____

Project Management Review: _____ **Date:** 7/21/99

SIGNED ORIGINAL MUST BE RETAINED IN THE PROJECT FILE

DEPENDABLE EXPRESS SERVICE, INC.

17064 Pepper Brook Way
Hacienda Heights, CA 91745
(626) 913-2273

№ 128658

Reg. ☐
Rush ☐
Exp. ☒

MESSENGER	24 HOUR SERVICE	DATE
Essex		7-21-99

CHARGE TO: Quanterra

ADDRESS: 1721 S. Grand Ave, Santa Ana — SUITE #:

AUTHORIZED BY: — REF: 340

PICK UP FROM: Phibro-Tech

STREET AND NUMBER: 6851 Dice Rd. — SUITE #:

CITY: Santa Fe Springs — ZIP CODE: 90670

DELIVER TO: Quanterra

STREET AND NUMBER: 1721 S. Grand Ave. — SUITE #:

CITY: Santa Ana — ZIP CODE: 92705

RETURN: ☐ YES ☐ NO

P/U TIME	DEL TIME	COMMODITY
3:33P	4:20 P	Samples
WAITING TIME 30 MIN.	WEIGHT 10 LBS.	NO. PCS. 1

SPECIAL INSTRUCTIONS:

FOR OFFICE USE ONLY	
DEL. CHG.	
RETURN	
RUSH	
EXP.	
NIGHT OR HOLIDAY	
WAITING TIME	
EXTRA WEIGHT	
SUB TOTAL	
CASH ADVANCE	
TOTAL	

RECEIVED BY (PLEASE SIGN LEGIBLY)

X

RETURN RECEIVED BY (PLEASE SIGN LEGIBLY)

X 7/21/99 1620

Terms and Conditions Upon Which Pick-ups and Deliveries are made

Not responsible for loss or damage (A) Unless same is reported to us in writing within fifteen (15) days. Loss limited to $100.00 per shipment unless a higher value is declared by customer on front of this ticket at time pick-up or delivery is authorized, in which case extra rates may be charged by us for insuring the excess value. Losses adjusted on basis of invoice cost price less reasonable depreciation.

WHITE-OFFICE YELLOW-DRIVER PINK-CUSTOMER

Chain of Custody Record

Quanterra

QUA-4124

Client	Project Manager	Date	Chain Of Custody Number
C.D.M.	S. WALLIN	7/22/99	22351
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 2**
18881 VON KARMAN #650	949-752-5452		
City / **State** / **Zip Code**	**Site Contact**		
IRVINE / CA	R. LOPEZ		
Project Name	**Carrier/Waybill Number**		
P.T.I.			
Contract/Purchase Order/Quote No.			
2279-11462-111.FLD			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: BTEX/OVOC	Analysis: Cr+6	Analysis: Cr Cd
PTI - [redacted] -MW35-044	7/22/99	7:20	water	120ml	VOA	3	HCl		X		
" " "	"	↓	"	500ml	POLY	1	NONE			X	
" " "	"	↓	"	500ml	POLY	1	HNO_3				X
PTI - MW4[redacted] -044	7/22/99	8:30	water	120ml	VOA	3	HCl		X		
" " "	"	↓	"	500ml	POLY	1	NONE			X	
" " "	"	↓	"	500ml	POLY	1	HNO_3				X
P.T.I - MW145 -044	7/22/99	9:35	water	120ml	VOA	3	HCl		X		
" "	"	↓	"	500ml	POLY	1	NONE			X	
" "	"	↓	"	500ml	POLY	1	HNO_3				X
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]
PTI - MW155 -044	7/22/99	10:35	water	120ml	VOA	3	HCl		X		
" "	"	↓	"	500ml	POLY	1	NONE			X	
" "	"	↓	"	500ml	POLY	1	HNO_3				X
PTI - MW15D -044		11:35		"			"		X		
" "		↓								X	
" "		↓									X

Special Instructions

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal

☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required

☒ Normal ☐ Rush

QC Level

☐ I. ☐ II. ☐ III.

Project Specific (Specify)

	Relinquished By	Date	Time	Received By	Date	Time
1.	[signature]	15:45	7-22-99	Eddie Velasco	15:45	7-22-99
2.	Eddie Velasco	7-22-99	4:45	[signature]	7/22/99	16:45
3.						

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

Quanterra

QUA-4124

Client	Project Manager	Date	Chain Of Custody Number
C.D.M.	S. WALLIN		22353
Address 18881 VON KARMAN #650	**Telephone Number (Area Code)/Fax Number** (949) 752-5452	**Lab Number**	**Page** 2 of 2
City IRVINE / **State** / **Zip Code**	**Site Contact** R. LOPEZ		
Project Name PTI	**Carrier/Waybill Number**		
Contract/Purchase Order/Quote No. 2279-11462-111-FLD			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: 8260 VOC	Analysis: TPH	Analysis: Cd
PTI-MW16-044	7/22/99	13:40	water	120 ml	VOA	3	HCl		X		
" "	"	↓	"	500 ml	POLY	1	NONE			X	
" "	"	↓	"	500 ml	POLY	1	HNO_3				X
PTI-TB02-044	7/22/99	14:00	water	120 ml	VOA	3	HCl		X		
" "	"	↓	"	500 ml	POLY	1	NONE			X	
" "	"	↓	"	500 ml	POLY	1	HNO_3				X
PTI-MW37-044	7-22-99	12:40		11			11		X		
↓	↓	↓	↓							X	
											X
PTI-MW09-044		14:58		11			11		X		
↓	↓	↓	↓							X	
											X
PTI-TB03-044	↓	—	↓	120 ml	VOA	3	HCl		X		

Special Instructions

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required
☒ Normal ☐ Rush

QC Level
☐ I. ☐ II. ☐ III.

Project Specific (Specify)

	Date	Time		Date	Time
1. Relinquished By	7-22-99	15:45	1. Received By	7-22-99	15:45
2. Relinquished By	7-22-99	4:45	2. Received By	7/22/99	1645
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

QUANTERRA INC. - SANTA ANA

PROJECT RECEIPT CHECKLIST

Date: 7/22/99

Quantims Lot #: EQG220269 Quote #: 29776

Client Name: CDM Project: PTI

Received by: RMARTIN Date/Time Received:

Delivered by : ☐ Client ☐ Airborne ☐ Fed Ex ☐ DHL ☐ Ultra-Ex ☐ Rey B.
☐ UPS ☐ ATD ☑ Other Peggy Arbeen

Initial / Date

Custody Seal Status: ☐ Intact ☐ Broken ☑ None ..... RW 7/22

Custody Seal #(s): ☑ No Seal # .....

Sample Container(s): ☑ Quanterra ☐ Client ☐ N/A .....

Temperature(s) (COOLER/BLANK) in °C: 6.0 (CORRECTED TEMP).....

Thermometer Used : ☑ IR (Infra-red) ☐ Digital (Probe) .....

Samples: ☑ Intact ☐ Broken ☐ Other .....

Anomalies: ☑ No ☐ Yes (See Clouseau) .....

Labeled by .....

Labeling checked by .....

Short-Hold Notification: ☐ Ph ☑ Wet Chem ☐ Metals (Filter/Pres) ☐ Encore ☐ N/A ...

Outside Analysis(es) (Test/Lab/Date Sent Out) :

_____ .....

_____ .....

_____ .....

_____ .....

********** LEAVE NO BLANK SPACES ; USE N/A **********

Fraction	1/9	10									PH
VOAh /*	3	2									N/A
500 PB	1										N/A
500 PBn	1										<2

h:HCl s:H2SO4 na:Sodium Hydroxide znna: Sodium Hydroxide + Zinc Acetate n:HNO3 n/f:HNO3 field filtered

* Number VOA's w/ air bubbles present n/f/l:HNO3 Lab filtered

LOGGED BY/DATE: RW 7/22/99 REVIEWED BY/DATE:

PRC Ver. 4 021599

COC419

DEPENDABLE EXPRESS SERVICE, INC.

17064 Pepper Brook Way
Hacienda Heights, CA 91745
(626) 913-2273

No. 125387

Reg. ☐
Rush ☐
Exp. ☒

MESSENGER	24 HOUR SERVICE	DATE
ENOK		7-22-99

CHARGE TO: QUANTERRA

ADDRESS: 1721 GRAND — SUITE #:

AUTHORIZED BY: — REF: 340

PICK UP FROM: CDM

STREET AND NUMBER: 9851 DICE ST — SUITE #:

CITY: SANTA FA SPRINGS — ZIP CODE:

DELIVER TO: QUANTERRA

STREET AND NUMBER: 1721 GRAND — SUITE #:

CITY: SANTA ANA — ZIP CODE:

RETURN: ☐ YES ☐ NO

P/U TIME: 3:45 — DEL. TIME: 4:45 — COMMODITY:

WAITING TIME: ~~45~~ MIN. — WEIGHT: 65 LBS. — NO. PCS: 10

SPECIAL INSTRUCTIONS:

FOR OFFICE USE ONLY	
DEL. CHG.	
RETURN	
RUSH	
EXP.	
NIGHT OR HOLIDAY	
WAITING TIME	
EXTRA WEIGHT	
SUB TOTAL	
CASH ADVANCE	
TOTAL	

RECEIVED BY (PLEASE SIGN LEGIBLY)

X [signature]

RETURN RECEIVED BY (PLEASE SIGN LEGIBLY)

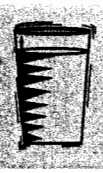
X [signature] 7/22/99 16:45

Terms and Conditions Upon Which Pick-ups and Deliveries are made

Not responsible for loss or damage (A) Unless same is reported to us in writing within fifteen (15) days. Loss limited to $100.00 per shipment unless a higher value is declared by customer on front of this ticket at time pick-up or delivery is authorized, in which case extra rates may be charged by us for insuring the excess value. Losses adjusted on basis of invoice cost price less reasonable depreciation.

WHITE-OFFICE YELLOW-DRIVER PINK-CUSTOMER

Appendix D
Background Groundwater Concentrations



SAFETY STANDARDS

There are two types of standards that protect your water supply. Primary standards address contaminants that could affect our health. Secondary standards regulate chemicals that affect the aesthetic qualities of water, such as taste, odor and appearance. Regulations establish a Maximum Contaminant Level (MCL) for each. Santa Fe Springs sees to it that MCLs are met, and corrected if they are exceeded. Not all chemicals are regulated with MCLs, but many more chemicals are being added to the compliance list each year by the Department of Health Services and the U.S. Environmental Protection Agency. California also requires monitoring of unregulated chemicals.

Water treatment procedures have all but eliminated water-borne diseases. Media reports of cryptosporidium in water have been over exaggerated and there is little if any chance of it being present.

While the public is not at risk, cryptosporidium can prove life-threatening to people with compromised immune systems - such as chemotherapy patients, organ and bone marrow recipients or people infected with HIV or AIDS. As a precaution, people with such conditions should consult their doctor or health care provider to prevent infection from all potential sources. They may also boil their water for five minutes before consumption as a further precaution.

UNDERSTANDING THE WATER QUALITY REPORT

The information on the chart shows the results for various water quality analysis conducted during the year. When reading the list, you will note that Santa Fe Springs' water supply is of better quality than required by Federal and State standards.

This report is an important part of the City of Santa Fe Springs' ongoing water quality effort as required by the California Department of Health Services. If you have any questions about this information, please call 868-0511.

LEGEND

mg/l	=	MILLIGRAMS PER LITER (Parts per million)
ug/l	=	MICROGRAMS PER LITER (Parts per billion)
umhos/cm	=	MICROMHOS PER CENTIMETER
MCL	=	MAXIMUM CONTAMINANT LEVEL
MFL	=	MILLION FIBERS PER LITER (Longer than 10 um)
ND	=	NONE DETECTED
pCi/l	=	picoCuries PER LITER
NR	=	NOT ANALYZED
NR	=	NOT REQUIRED FOR COMPLIANCE PURPOSES
NC	=	NOT COLLECTED
W	=	MONITORING IS WAIVED (Based on vulnerability assessment, historic data and source susceptibility)

(a) Monitoring was completed for unregulated organics in addition to the regulated constituents listed. Results for all constituents were below detection levels unless otherwise noted.

(b) Fluoride results and MCL's are temperature dependent.

(c) Samples for this constituent were collected from points in the distribution system.

(d) The Metropolitan Water District of Southern California, which supplies the surface water, has developed a more accurate method to detect odors. This information is available upon request from the Metropolitan Water District.

(e) Action level based on sample results at customer tap.

(f) Secondary MCL indicated in parentheses.

CONSTITUENTS(a)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	SURFACE WATER AVERAGE	SURFACE WATER RANGE	MCL (b)
GENERAL MINERAL - mg/l					
TOTAL HARDNESS	249	37-338	286	249-327	—
CALCIUM	72	15-99	69	60-80	—
MAGNESIUM	19	ND-35	28	24-32	—
SODIUM	75	39-136	97	86-112	—
POTASSIUM	3.1	1.4-4.2	4.5	3.9-5.1	—
TOTAL ALKALINITY (as CaCO3)	163	104-185	116	103-132	—
SULFATE	154	59-290	246	206-294	250-600 (f)
CHLORIDE	55	18-88	91	80-102	250-600 (f)
NITRATE (as NO3)	3.3	ND-12.0	.95	ND-1.63	45
NITRITE (as N)	ND	ND	ND	ND	1
FLUORIDE	0.47(b)	0.29-1.00	0.23	0.17-0.28	1.4-2.4
COPPER	0.13	ND-0.467	ND	ND	1 (e)
IRON	0.121	ND-0.525	ND	ND	0.3 (f)
MANGANESE	0.008	ND-0.031	ND	ND	0.05 (f)
ZINC	ND	ND	ND	ND	5 (f)
FOAMING AGENT (MBAS)	ND	ND	ND	ND	0.5 (f)
TOTAL DISSOLVED SOLIDS	590	250-739	617	541-715	500-1500(f)
GENERAL PHYSICAL					
pH (std unit)	8.0	7.9-8.5	8.04	8.00-8.08	6.5-8.5 (f)
SPECIFIC CONDUCTANCE (umhos/cm)	771	390-1130	991	896-1114	900-2200(f)
UNITS OF COLOR	ND (c)	ND-5	2.5	1.0-4.0	15 (f)
THRESHOLD ODOR NO. (TON)	1 (c)	1-2	(d)	(d)	3 (f)
TURBIDITY (ntu)	0.14(c)	0.10-0.90	0.08	0.06-0.10	5 (f)
RADIOLOGICAL - pCi/l					
GROSS ALPHA	1.6	ND-6.3	6.6	ND-11.7	15
URANIUM	5.3	4.0-6.0	4.6	3.3-5.7	20
GROSS BETA	NR	NR	7.3	1.2-11.2	50
INORGANICS - mg/l					
ANTIMONY	ND	ND	ND	ND	0.006
ARSENIC	ND	ND-0.002	0.002	ND-0.003	0.05
ASBESTOS	W	W	ND	ND	7 MFL
BARIUM	0.018	ND-0.110	0.12	0.11-0.13	1
BERYLLIUM	ND	ND	ND	ND	0.004
CADMIUM	ND	ND	ND	ND	0.005
CHROMIUM	ND	ND	ND	ND	0.05
CYANIDE	W	W	ND	ND	0.2
LEAD	ND	ND-0.008	ND	ND	0.015 (e)
MERCURY	ND	ND	ND	ND	0.002
NICKEL	ND	ND	0.004	0.003-0.008	0.1
SELENIUM	ND	ND	ND	ND	0.05
SILVER	ND	ND	ND	ND	0.1
THALLIUM	ND	ND	ND	ND	0.002
ALUMINUM	ND	ND	0.165	0.093--0.214	1 (0.2) (f)
ORGANICS - ug/l					
2, 4-D	ND	ND	ND	ND	70
2, 4, 5-TP SILVEX	W	W	NA	NA	50
ALACHLOR	W	W	ND	ND	2
ATRAZINE	ND	ND	ND	ND	3
SIMAZINE	ND	ND	ND	ND	4
BENTAZON	W	W	ND	ND	18
BENZO (a) pyrene	W	W	ND	ND	0.2
CARBARYL	ND	ND	NA	NA	
CARBOFURAN	W	W	ND	ND	18
CHLORDANE	ND	ND	ND	ND	0.1
DALAPON	W	W	ND	ND	200
DINOSEB	W	W	ND	ND	7
DIQUAT	ND	ND	ND	ND	20
Di(2-ethylhexyl)adipate (DEHA)	W	W	ND	ND	400
Di(2-ethylhexyl)phthalate (DEHP)	W	W	ND	ND	4
ETHYLENE DIBROMIDE (EDB)	W	W	ND	ND	0.05
1, 2, DIBRDMD-3-CHLORDPROPANE (DBCP)	W	W	ND	ND	0.2
ENDOTHALL	W	W	ND	ND	100
ENDRIN	W	W	ND	ND	2
GLYPHOSATE	ND	ND	ND	ND	700
HEPTACHLOR	W	W	ND	ND	0.01
HEPTACHLOR EPOXIDE	W	W	ND	ND	0.01
HEXACHLOROBENZENE	W	W	ND	ND	50
HEXACHLOROCYCLOPENTADIENE	W	W	ND	ND	50
LINDANE	W	W	ND	ND	0.2
METHOXYCHLOR	W	W	ND	ND	40
MOLINATE	W	W	ND	ND	20
OXAMYL (VYDATE)	W	W	ND	ND	200
PENTACHLORDPHENOL	W	W	ND	ND	1
PICLORAM	W	W	ND	ND	500
POLYCHLORINATED BIPHENYLS (PCB's)	W	W	ND	ND	0.5
THIOBENCARB	W	W	ND	ND	70
TOXAPHENE	W	W	ND	ND	3
2,3,7,8-TCDD (Dioxin)	W	W	ND	ND	3xE-8
TRIHALOMETHANES, TOTAL - TTHMS (c)	37.4	ND-96.0	38.5	20.0-64.0	100
BENZENE	ND	ND	ND	ND	1
CARBON TETRACHLORIDE	ND	ND	ND	ND	0.5
DICHLOROMETHANE	ND	ND	ND	ND	5
MONOCHLOROBENZENE	ND	ND	ND	ND	30
1,4-DICHLOROBENZENE	ND	ND	ND	ND	5
1,1-DICHLOROETHANE - 11DCA	ND	ND	ND	ND	5
1,2-DICHLOROETHANE - 12DCA	ND	ND	ND	ND	0.5
1,1-DICHLOROETHENE - 11DCE	ND	ND	ND	ND	6
cis-1,2-DICHLOROETHENE	ND	ND	ND	ND	6
trans-1,2-DICHLOROETHENE	ND	ND	ND	ND	10
1,2-DICHLOROPROPANE	ND	ND	ND	ND	5
1,3-DICHLOROPROPENE	ND	ND	ND	ND	0.5
ETHYLBENZENE	ND	ND	ND	ND	700
FLUOROTRICHLOROMETHANE - FREON 11	ND	ND	ND	ND	150
STYRENE	ND	ND	ND	ND	100
1,1,2,2-TETRACHLORDETHANE	ND	ND	ND	ND	1
TETRACHLOROETHENE - PCE	1.1	ND-4.8	ND	ND	5
1,2,4-TRICHLOROBENZENE	ND	ND	ND	ND	70
TOLUENE	ND	ND	ND	ND	150
1,1,1-TRICHLORDETHANE -1,1,1TCA	ND	ND	ND	ND	200
1,1,2-TRICHLORDETHANE -1,1,2TCA	ND	ND	ND	ND	5
TRICHLOROETHENE - TCE	0.3	ND-1.2	ND	ND	5
TRICHLOROTRIFLUOROETHANE - FREON 113	ND	ND	ND	ND	1,200
VINYL CHLORIDE	ND	ND	ND	ND	0.5
XYLENES, TOTAL (m, p & o)	ND	ND	ND	ND	1750
COLIFORM BACTERIA (c)					
COLIFORM BACTERIA PA % POSITIVE	0	0	NA	NA	5
COLIFORM BACTERIA MF CFU/100mL	NC	NC	0.12	0-1.1	1
NO. OF ACUTE VIOLATIONS	0	0	0	0	0

Appendix E
Statistical Analysis

Appendix E-1
Upper Tolerance Level Calculations

SUMMARY OF UPPER TOLERANCE LEVEL CALCULATIONS
Quarterly Background Data: January 1989 to July 1999
Southern California Chemical

POISSON DISTRIBUTED UPPER TOLERANCE LEVEL

COMPOUND	Hexa Chromium	Total Chromium	Cadmium	Copper	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Trichloroethene
Percent Detected	2.3%	9.3%	2.3%	25.6%	2.3%	9.3%	30.2%	32.6%	NOT
Sample number(n)	43	43	43	43	43	43	43	43	CALC.
Tn	0.5430	0.3911	0.1209	0.6368	13.1550	25.6050	40.2050	72.9550	
2Tn+2	3.09	2.78	2.24	3.27	28.31	53.21	82.41	147.91	
Chi Squared @95% of dist	7.81	5.99	5.99	7.81	41.34	70.99	104.14	176.29	
lamda Tn	0.280	0.194	0.156	0.297	13.608	43.925	99.792	303.205	
Two time Lamda Tn	0.561	0.388	0.312	0.595	27.215	87.850	199.583	606.410	
Beta cov. @95%, deg fr.	4	4	3	4	41	112	234	666	
k, from 2k+2 deg fr.	1.00	1.00	0.50	1.00	19.50	55.00	116.00	332.00	

AITCHISON ADJUSTMENT AND CALCULATION OF UPPER TOLERANCE LEVELS

Number of ND(d)	NOT	39	NOT	32	NOT	39	30	29	NO ADJ. REQ.
Number of values(n)	CALC.	43	CALC.	43	CALC.	43	43	43	
Mean of det values		0.0475		0.029		1.650	1.977	4.050	
STD of det values		0.041		0.010		0.420	0.738	1.435	
Atch. Adj. mean/mean(1)		0.004		0.007		0.153	0.598	1.319	11.972
Atch. Adj. std./std. (1)		0.018		0.014		0.498	1.000	2.080	5.382
K for Tolerance Limit		2.353		1.812		2.353	1.782	1.771	1.682
Adjusted Tol. Limit		0.046		0.032		1.325	2.380	5.001	
Unadjusted Tol. Limit									21.024

(1) Unadjusted mean and std. used to compute upper tolerance level for TCE

Appendix E-2
Nonparametric ANOVA Results

χ^2 @ 95% CL = 3.84

IMPORT successfully completed.

736 cases and 6 variables processed and saved.

772 cases and 6 variables processed and saved.

772 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jul99\1-11.syd,
created Wed Oct 06, 1999 at 13:21:46, contains variables:

WELL$	PARAM_ID$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU

The following results are for:
PARAM_ID$ = BEN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-11	43	2193.000
MW-1S	43	1548.000

Mann-Whitney U test statistic = 1247.000
Probability is 0.002
Chi-square approximation = 9.530 with 1 df

R

The following results are for:
PARAM_ID$ = CD

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-11	43	1830.500
MW-1S	43	1910.500

Mann-Whitney U test statistic = 884.500
Probability is 0.627

Chi-square approximation = 0.237 with 1 df A

The following results are for:
PARAM_ID$ = CU

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-11	43	1902.000
MW-1S	43	1839.000

Mann-Whitney U test statistic = 956.000
Probability is 0.747
Chi-square approximation = 0.104 with 1 df A

The following results are for:
PARAM_ID$ = EBN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-11	43	2720.500
MW-1S	43	1020.500

Mann-Whitney U test statistic = 1774.500
Probability is 0.000
Chi-square approximation = 55.624 with 1 df R

The following results are for:
PARAM_ID$ = HCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-11	43	1813.500
MW-1S	43	1927.500

Mann-Whitney U test statistic = 867.500
Probability is 0.456
Chi-square approximation = 0.555 with 1 df A

The following results are for:
PARAM_ID$ = TCE

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-11	43	2709.000
MW-1S	43	1032.000

Mann-Whitney U test statistic = 1763.000
Probability is 0.000
Chi-square approximation = 52.477 with 1 df R

The following results are for:
PARAM_ID$ = TCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-11	43	1864.500
MW-1S	43	1876.500

Mann-Whitney U test statistic = 918.500
Probability is 0.942
Chi-square approximation = 0.005 with 1 df A

The following results are for:
PARAM_ID$ = TOL

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 84 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-11	42	2405.500
MW-1S	42	1164.500

Mann-Whitney U test statistic = 1502.500
Probability is 0.000
Chi-square approximation = 33.976 with 1 df R

The following results are for:
PARAM_ID$ = TX

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-11, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 86 cases

Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-11	43	2514.500
MW-1S	43	1226.500

Mann-Whitney U test statistic = 1568.500
Probability is 0.000
Chi-square approximation = 31.932 with 1 df

SYSTAT Rectangular file O:\2279-111\Jul99\1-14s.syd,
created Wed Oct 06, 1999 at 13:21:50, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

The following results are for:
PARAM_ID$ = BEN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 78 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-14S	35	1624.000
MW-1S	43	1457.000

Mann-Whitney U test statistic = 994.000
Probability is 0.003
Chi-square approximation = 8.816 with 1 df

The following results are for:
PARAM_ID$ = CD

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 78 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-14S	35	1403.500
MW-1S	43	1677.500

Mann-Whitney U test statistic = 773.500
Probability is 0.745
Chi-square approximation = 0.106 with 1 df

The following results are for:
PARAM_ID$ = CU

Categorical values encountered during processing are:

WELL$ (2 levels)
MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 78 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-14S	35	1644.500
MW-1S	43	1436.500

Mann-Whitney U test statistic = 1014.500
Probability is 0.003
Chi-square approximation = 8.870 with 1 df

The following results are for:
PARAM_ID$ = EBN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 78 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-14S	35	1882.500
MW-1S	43	1198.500

Mann-Whitney U test statistic = 1252.500
Probability is 0.000
Chi-square approximation = 27.112 with 1 df

The following results are for:
PARAM_ID$ = HCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 78 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-14S	35	1665.000
MW-1S	43	1416.000

Mann-Whitney U test statistic = 1035.000
Probability is 0.001
Chi-square approximation = 11.185 with 1 df

The following results are for:
PARAM_ID$ = TCE

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 78 cases
Dependent variable is VALUE

Grouping variable is WELL$

Group	Count	Rank Sum
MW-14S	35	2101.000
MW-1S	43	980.000

Mann-Whitney U test statistic = 1471.000
Probability is 0.000
Chi-square approximation = 52.148 with 1 df

The following results are for:
PARAM_ID$ = TCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 78 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-14S	35	1947.000
MW-1S	43	1134.000

Mann-Whitney U test statistic = 1317.000
Probability is 0.000
Chi-square approximation = 38.638 with 1 df

The following results are for:
PARAM_ID$ = TOL

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 76 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-14S	34	1529.500
MW-1S	42	1396.500

Mann-Whitney U test statistic = 934.500
Probability is 0.005
Chi-square approximation = 7.808 with 1 df

The following results are for:
PARAM_ID$ = TX

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-14S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 78 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-14S	35	1657.500

MW-1S 43 1423.500
Mann-Whitney U test statistic = 1027.500
Probability is 0.004
Chi-square approximation = 8.466 with 1 df R

SYSTAT Rectangular file O:\2279-111\Jul99\1-15s.syd,
created Wed Oct 06, 1999 at 13:21:54, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

The following results are for:
PARAM_ID$ = BEN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 79 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group Count Rank Sum

MW-15S 36 1444.000
MW-1S 43 1716.000
Mann-Whitney U test statistic = 778.000
Probability is 0.951
Chi-square approximation = 0.004 with 1 df A

The following results are for:
PARAM_ID$ = CD

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 79 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group Count Rank Sum

MW-15S 36 1524.000
MW-1S 43 1636.000
Mann-Whitney U test statistic = 858.000
Probability is 0.214
Chi-square approximation = 1.544 with 1 df A

The following results are for:
PARAM_ID$ = CU

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 79 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-15S	36	1373.000
MW-1S	43	1787.000

Mann-Whitney U test statistic = 707.000
Probability is 0.388
Chi-square approximation = 0.746 with 1 df

A

The following results are for:
PARAM_ID$ = EBN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 79 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-15S	36	1736.000
MW-1S	43	1424.000

Mann-Whitney U test statistic = 1070.000
Probability is 0.002
Chi-square approximation = 9.558 with 1 df

R

The following results are for:
PARAM_ID$ = HCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 79 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-15S	36	1423.000
MW-1S	43	1737.000

Mann-Whitney U test statistic = 757.000
Probability is 0.807
Chi-square approximation = 0.060 with 1 df

A

The following results are for:
PARAM_ID$ = TCE

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 79 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-15S	36	912.500
MW-1S	43	2247.500

Mann-Whitney U test statistic = 246.500
Probability is 0.000
Chi-square approximation = 26.990 with 1 df

The following results are for:
PARAM_ID$ = TCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 79 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-15S	36	1585.500
MW-1S	43	1574.500

Mann-Whitney U test statistic = 919.500
Probability is 0.056
Chi-square approximation = 3.652 with 1 df A

The following results are for:
PARAM_ID$ = TOL

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 77 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-15S	35	1508.000
MW-1S	42	1495.000

Mann-Whitney U test statistic = 878.000
Probability is 0.075
Chi-square approximation = 3.178 with 1 df A

The following results are for:
PARAM_ID$ = TX

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-15S, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 79 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-15S	36	1594.500
MW-1S	43	1565.500

Mann-Whitney U test statistic = 928.500
Probability is 0.108
Chi-square approximation = 2.578 with 1 df A

SYSTAT Rectangular file O:\2279-111\Jul99\1-16.syd,
created Wed Oct 06, 1999 at 13:21:56, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

The following results are for:
PARAM_ID$ = BEN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 73 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-16	30	1424.000
MW-1S	43	1277.000

Mann-Whitney U test statistic = 959.000
Probability is 0.000
Chi-square approximation = 17.334 with 1 df R

The following results are for:
PARAM_ID$ = CD

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 73 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-16	30	1102.500
MW-1S	43	1598.500

Mann-Whitney U test statistic = 637.500
Probability is 0.883
Chi-square approximation = 0.022 with 1 df A

The following results are for:
PARAM_ID$ = CU

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 73 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-16	30	1105.000
MW-1S	43	1596.000

Mann-Whitney U test statistic = 640.000
Probability is 0.943
Chi-square approximation = 0.005 with 1 df A

The following results are for:
PARAM_ID$ = EBN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 73 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-16	30	1636.500
MW-1S	43	1064.500

Mann-Whitney U test statistic = 1171.500
Probability is 0.000
Chi-square approximation = 37.182 with 1 df R

The following results are for:
PARAM_ID$ = HCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 73 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-16	30	1041.500
MW-1S	43	1659.500

Mann-Whitney U test statistic = 576.500
Probability is 0.234
Chi-square approximation = 1.418 with 1 df A

The following results are for:
PARAM_ID$ = TCE

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 73 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-16	30	1732.500
MW-1S	43	968.500

Mann-Whitney U test statistic = 1267.500
Probability is 0.000
Chi-square approximation = 48.757 with 1 df

The following results are for:

PARAM_ID$ = TCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 73 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-16	30	1090.000
MW-1S	43	1611.000

Mann-Whitney U test statistic = 625.000
Probability is 0.679
Chi-square approximation = 0.171 with 1 df A

The following results are for:
PARAM_ID$ = TOL

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 71 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-16	29	1386.500
MW-1S	42	1169.500

Mann-Whitney U test statistic = 951.500
Probability is 0.000
Chi-square approximation = 20.250 with 1 df R

The following results are for:
PARAM_ID$ = TX

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-16, MW-1S

Kruskal-Wallis One-Way Analysis of Variance for 73 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-16	30	1480.000
MW-1S	43	1221.000

Mann-Whitney U test statistic = 1015.000
Probability is 0.000
Chi-square approximation = 18.145 with 1 df R

SYSTAT Rectangular file O:\2279-111\Jul99\1-3.syd,
created Wed Oct 06, 1999 at 13:22:00, contains variables:

WELL$	PARAM_ID$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU

The following results are for:
PARAM_ID$ = BEN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1655.000
MW-3	43	2086.000

Mann-Whitney U test statistic = 709.000
Probability is 0.017
Chi-square approximation = 5.712 with 1 df

R

The following results are for:
PARAM_ID$ = CD

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1870.500
MW-3	43	1870.500

Mann-Whitney U test statistic = 924.500
Probability is 1.000
Chi-square approximation = 0.000 with 1 df

A

The following results are for:
PARAM_ID$ = CU

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1938.500
MW-3	43	1802.500

Mann-Whitney U test statistic = 992.500
Probability is 0.428
Chi-square approximation = 0.630 with 1 df

A

The following results are for:

PARAM_ID$ = EBN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1511.500
MW-3	43	2229.500

Mann-Whitney U test statistic = 565.500
Probability is 0.001
Chi-square approximation = 10.887 with 1 df R

The following results are for:
PARAM_ID$ = HCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1850.000
MW-3	43	1891.000

Mann-Whitney U test statistic = 904.000
Probability is 0.799
Chi-square approximation = 0.065 with 1 df A

The following results are for:
PARAM_ID$ = TCE

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1118.000
MW-3	43	2623.000

Mann-Whitney U test statistic = 172.000
Probability is 0.000
Chi-square approximation = 42.286 with 1 df

The following results are for:
PARAM_ID$ = TCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1830.000
MW-3	43	1911.000

Mann-Whitney U test statistic = 884.000
Probability is 0.586
Chi-square approximation = 0.296 with 1 df

The following results are for:
PARAM_ID$ = TOL

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 84 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	42	1507.500
MW-3	42	2062.500

Mann-Whitney U test statistic = 604.500
Probability is 0.002
Chi-square approximation = 9.433 with 1 df

The following results are for:
PARAM_ID$ = TX

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-3

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1630.000
MW-3	43	2111.000

Mann-Whitney U test statistic = 684.000
Probability is 0.027
Chi-square approximation = 4.885 with 1 df

SYSTAT Rectangular file O:\2279-111\Jul99\1-4.syd,
created Wed Oct 06, 1999 at 13:22:02, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

The following results are for:
PARAM_ID$ = BEN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1211.500
MW-4	43	2529.500

Mann-Whitney U test statistic = 265.500
Probability is 0.000
Chi-square approximation = 37.854 with 1 df R

The following results are for:
PARAM_ID$ = CD

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	968.500
MW-4	43	2772.500

Mann-Whitney U test statistic = 22.500
Probability is 0.000
Chi-square approximation = 65.512 with 1 df R

The following results are for:
PARAM_ID$ = CU

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1760.000
MW-4	43	1981.000

Mann-Whitney U test statistic = 814.000
Probability is 0.257
Chi-square approximation = 1.285 with 1 df A

The following results are for:
PARAM_ID$ = EBN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1059.000
MW-4	43	2682.000

Mann-Whitney U test statistic = 113.000
Probability is 0.000
Chi-square approximation = 51.091 with 1 df

The following results are for:
PARAM_ID$ = HCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	946.000
MW-4	43	2795.000

Mann-Whitney U test statistic = 0.000
Probability is 0.000
Chi-square approximation = 68.369 with 1 df

The following results are for:
PARAM_ID$ = TCE

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	947.000
MW-4	43	2794.000

Mann-Whitney U test statistic = 1.000
Probability is 0.000
Chi-square approximation = 63.675 with 1 df

The following results are for:
PARAM_ID$ = TCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum

MW-1S 43 946.000
MW-4 43 2795.000
Mann-Whitney U test statistic = 0.000
Probability is 0.000
Chi-square approximation = 69.273 with 1 df

The following results are for:
PARAM_ID$ = TOL

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 84 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	42	1084.500
MW-4	42	2485.500

Mann-Whitney U test statistic = 181.500
Probability is 0.000
Chi-square approximation = 44.091 with 1 df

The following results are for:
PARAM_ID$ = TX

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-4

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1016.500
MW-4	43	2724.500

Mann-Whitney U test statistic = 70.500
Probability is 0.000
Chi-square approximation = 55.955 with 1 df

SYSTAT Rectangular file O:\2279-111\Jul99\1-6B.syd,
created Wed Oct 06, 1999 at 13:22:06, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

The following results are for:
PARAM_ID$ = BEN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 82 cases

Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1748.500
MW-6B	39	1654.500

Mann-Whitney U test statistic = 802.500
Probability is 0.637
Chi-square approximation = 0.223 with 1 df A

The following results are for:
PARAM_ID$ = CD

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 82 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1741.500
MW-6B	39	1661.500

Mann-Whitney U test statistic = 795.500
Probability is 0.542
Chi-square approximation = 0.372 with 1 df A

The following results are for:
PARAM_ID$ = CU

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 82 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1880.500
MW-6B	39	1522.500

Mann-Whitney U test statistic = 934.500
Probability is 0.218
Chi-square approximation = 1.515 with 1 df A

The following results are for:
PARAM_ID$ = EBN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 82 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum

MW-1S	43	1575.500
MW-6B	39	1827.500

Mann-Whitney U test statistic = 629.500
Probability is 0.037
Chi-square approximation = 4.352 with 1 df

The following results are for:
PARAM_ID$ = HCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 82 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1839.500
MW-6B	39	1563.500

Mann-Whitney U test statistic = 893.500
Probability is 0.448
Chi-square approximation = 0.575 with 1 df

The following results are for:
PARAM_ID$ = TCE

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 82 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1943.000
MW-6B	39	1460.000

Mann-Whitney U test statistic = 997.000
Probability is 0.141
Chi-square approximation = 2.168 with 1 df

The following results are for:
PARAM_ID$ = TCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 82 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1607.000
MW-6B	39	1796.000

Mann-Whitney U test statistic = 661.000
Probability is 0.026
Chi-square approximation = 4.973 with 1 df

The following results are for:
PARAM_ID$ = TOL

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 80 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	42	1498.500
MW-6B	38	1741.500

Mann-Whitney U test statistic = 595.500
Probability is 0.026
Chi-square approximation = 4.946 with 1 df

2

The following results are for:
PARAM_ID$ = TX

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-6B

Kruskal-Wallis One-Way Analysis of Variance for 82 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1632.000
MW-6B	39	1771.000

Mann-Whitney U test statistic = 686.000
Probability is 0.126
Chi-square approximation = 2.343 with 1 df

A

SYSTAT Rectangular file O:\2279-111\Jul99\1-7.syd,
created Wed Oct 06, 1999 at 13:22:08, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

The following results are for:
PARAM_ID$ = BEN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1526.000

MW-7 43 2215.000
Mann-Whitney U test statistic = 580.000
Probability is 0.000
Chi-square approximation = 12.252 with 1 df

The following results are for:
PARAM_ID$ = CD

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1813.000
MW-7	43	1928.000

Mann-Whitney U test statistic = 867.000
Probability is 0.474
Chi-square approximation = 0.512 with 1 df

The following results are for:
PARAM_ID$ = CU

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1657.500
MW-7	43	2083.500

Mann-Whitney U test statistic = 711.500
Probability is 0.036
Chi-square approximation = 4.419 with 1 df

The following results are for:
PARAM_ID$ = EBN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1522.500
MW-7	43	2218.500

Mann-Whitney U test statistic = 576.500
Probability is 0.001
Chi-square approximation = 10.329 with 1 df

The following results are for:
PARAM_ID$ = HCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1885.500
MW-7	43	1855.500

Mann-Whitney U test statistic = 939.500
Probability is 0.852
Chi-square approximation = 0.035 with 1 df

A

The following results are for:
PARAM_ID$ = TCE

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	998.000
MW-7	43	2743.000

Mann-Whitney U test statistic = 52.000
Probability is 0.000
Chi-square approximation = 56.831 with 1 df

The following results are for:
PARAM_ID$ = TCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1771.500
MW-7	43	1969.500

Mann-Whitney U test statistic = 825.500
Probability is 0.219
Chi-square approximation = 1.512 with 1 df

A

The following results are for:
PARAM_ID$ = TOL

Categorical values encountered during processing are:
WELL$ (2 levels)

MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 84 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	42	1543.000
MW-7	42	2027.000

Mann-Whitney U test statistic = 640.000
Probability is 0.007
Chi-square approximation = 7.376 with 1 df R

The following results are for:
PARAM_ID$ = TX

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-7

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1728.000
MW-7	43	2013.000

Mann-Whitney U test statistic = 782.000
Probability is 0.184
Chi-square approximation = 1.769 with 1 df A

SYSTAT Rectangular file O:\2279-111\Jul99\1-9.syd,
created Wed Oct 06, 1999 at 13:22:12, contains variables:

WELL$	PARAM_ID$	VALUE	LN_VALUE	HD_VALUE	HD_LN_VALU

The following results are for:
PARAM_ID$ = BEN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1243.000
MW-9	43	2498.000

Mann-Whitney U test statistic = 297.000
Probability is 0.000
Chi-square approximation = 33.601 with 1 df R

The following results are for:

PARAM_ID$ = CD

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1833.000
MW-9	43	1908.000

Mann-Whitney U test statistic = 887.000
Probability is 0.633
Chi-square approximation = 0.228 with 1 df A

The following results are for:
PARAM_ID$ = CU

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1950.000
MW-9	43	1791.000

Mann-Whitney U test statistic = 1004.000
Probability is 0.362
Chi-square approximation = 0.830 with 1 df A

The following results are for:
PARAM_ID$ = EBN

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1163.500
MW-9	43	2577.500

Mann-Whitney U test statistic = 217.500
Probability is 0.000
Chi-square approximation = 39.129 with 1 df P

The following results are for:
PARAM_ID$ = HCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1689.500
MW-9	43	2051.500

Mann-Whitney U test statistic = 743.500
Probability is 0.048
Chi-square approximation = 3.912 with 1 df

The following results are for:
PARAM_ID$ = TCE

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	955.500
MW-9	43	2785.500

Mann-Whitney U test statistic = 9.500
Probability is 0.000
Chi-square approximation = 62.490 with 1 df

The following results are for:
PARAM_ID$ = TCR

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1611.000
MW-9	43	2130.000

Mann-Whitney U test statistic = 665.000
Probability is 0.004
Chi-square approximation = 8.277 with 1 df

The following results are for:
PARAM_ID$ = TOL

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 84 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	42	1147.000
MW-9	42	2423.000

Mann-Whitney U test statistic = 244.000
Probability is 0.000
Chi-square approximation = 36.875 with 1 df

The following results are for:
PARAM_ID$ = TX

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-9

Kruskal-Wallis One-Way Analysis of Variance for 86 cases
Dependent variable is VALUE
Grouping variable is WELL$

Group	Count	Rank Sum
MW-1S	43	1207.500
MW-9	43	2533.500

Mann-Whitney U test statistic = 261.500
Probability is 0.000
Chi-square approximation = 34.586 with 1 df

Appendix E-3
Parametric ANOVA Results

IMPORT successfully completed.

772 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jul99\1-11.SYD,
created Wed Oct 06, 1999 at 13:21:46, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-11, MW-1S

Dep Var: HD_VALUE N: 86 Multiple R: 0.582 Squared multiple R: 0.339

Estimates of effects $B = (X'X)^{-1} X'Y$

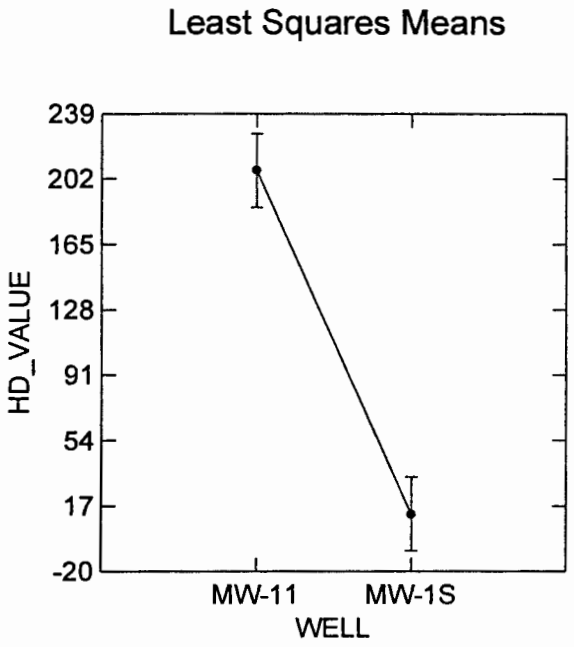
		HD_VALUE
CONSTANT		109.592
WELL$	MW-11	97.152

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	811717.395	1	811717.395	43.051	0.000
Error	1583791.209	84	18854.657		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-11	206.744	20.940	43
WELL$	=MW-1S	12.440	20.940	43



*** WARNING ***
Case 448 is an outlier (Studentized Residual = 3.565)
Case 729 is an outlier (Studentized Residual = 3.842)
Case 765 is an outlier (Studentized Residual = 4.324)

Durbin-Watson D Statistic 1.501
First Order Autocorrelation 0.236
COL/
ROW WELL$
1 MW-11
2 MW-1S
Using least squares means.
Post Hoc test of HD_VALUE

Using model MSE of 18854.657 with 84 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-194.305	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-11, MW-1S

Dep Var: HD_LN_VALU N: 86 Multiple R: 0.707 Squared multiple R: 0.499

Estimates of effects $B = (X'X)^{-1} X'Y$

		HD_LN_VALU
CONSTANT		3.559
WELL$	MW-11	1.104

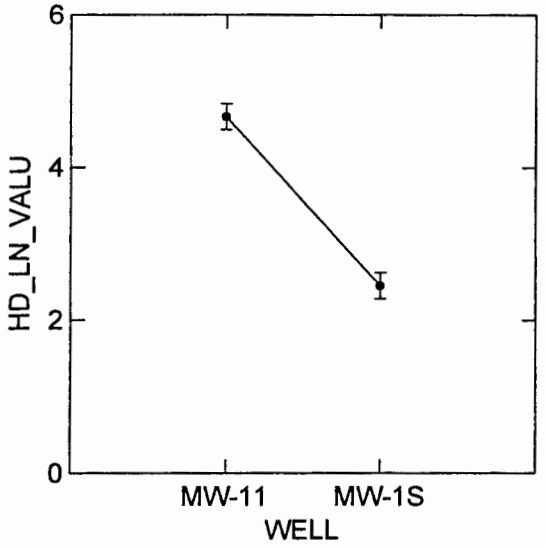
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	104.838	1	104.838	83.744	0.000
Error	105.159	84	1.252		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-11	4.663	0.171	43
WELL$	=MW-1S	2.455	0.171	43

Least Squares Means



*** WARNING ***
Case 121 is an outlier (Studentized Residual = -5.671)
Case 122 is an outlier (Studentized Residual = -5.671)

Durbin-Watson D Statistic 0.929
First Order Autocorrelation 0.399
COL/
ROW WELL$
1 MW-11
2 MW-1S
Using least squares means.
Post Hoc test of HD_LN_VALU

Using model MSE of 1.252 with 84 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-2.208	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

700 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jul99\1-14s.SYD,
created Wed Oct 06, 1999 at 13:21:50, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-14S, MW-1S

Dep Var: HD_VALUE N: 78 Multiple R: 0.688 Squared multiple R: 0.473

Estimates of effects $B = (X'X)^{-1} X'Y$

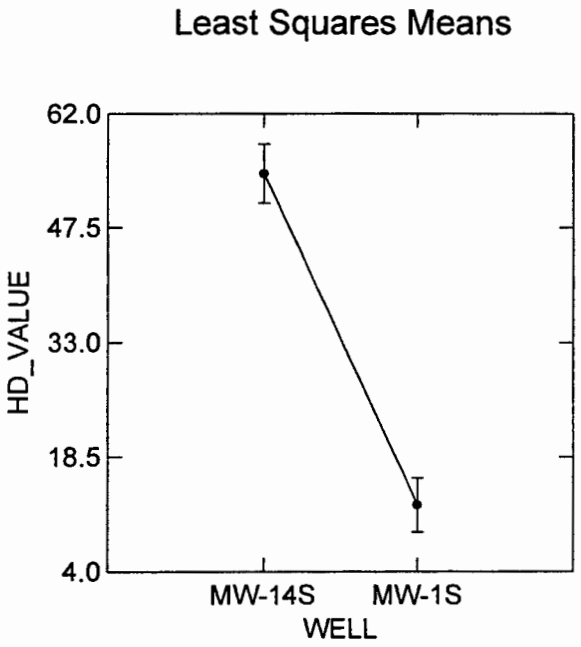
		HD_VALUE
CONSTANT		33.420
WELL$	MW-14S	20.980

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	33972.107	1	33972.107	68.268	0.000
Error	37819.923	76	497.631		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-14S	54.400	3.771	35
WELL$	=MW-1S	12.440	3.402	43



*** WARNING ***
Case 102 is an outlier (Studentized Residual = 7.512)

Durbin-Watson D Statistic 1.172
First Order Autocorrelation 0.393
COL/
ROW WELL$
1 MW-14S
2 MW-1S
Using least squares means.
Post Hoc test of HD_VALUE

Using model MSE of 497.631 with 76 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-41.960	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-14S, MW-1S

Dep Var: HD_LN_VALU N: 78 Multiple R: 0.791 Squared multiple R: 0.625

Estimates of effects $B = (X'X)^{-1} X'Y$

		HD_LN_VALU
CONSTANT		3.132
WELL$	MW-14S	0.677

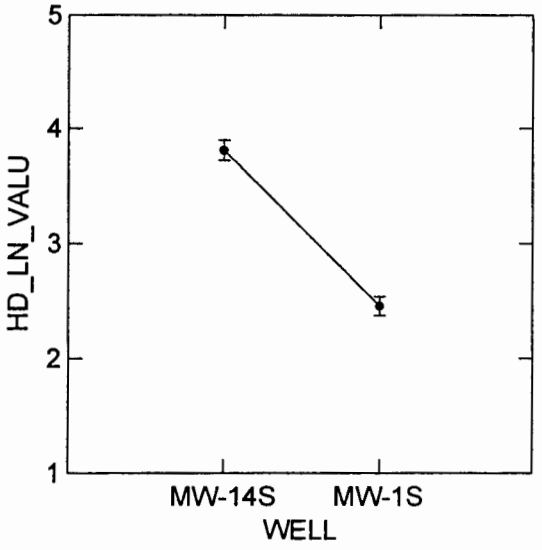
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	35.386	1	35.386	126.634	0.000
Error	21.237	76	0.279		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-14S	3.809	0.089	35
WELL$	=MW-1S	2.455	0.081	43

Least Squares Means



Durbin-Watson D Statistic 1.212
First Order Autocorrelation 0.364
COL/
ROW WELL$
1 MW-14S
2 MW-1S
Using least squares means.
Post Hoc test of HD_LN_VALU

Using model MSE of 0.279 with 76 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-1.354	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

709 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jul99\1-15s.SYD,
created Wed Oct 06, 1999 at 13:21:54, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-15S, MW-1S

Dep Var: HD_VALUE N: 79 Multiple R: 0.494 Squared multiple R: 0.244

Estimates of effects $B = (X'X)^{-1} X'Y$

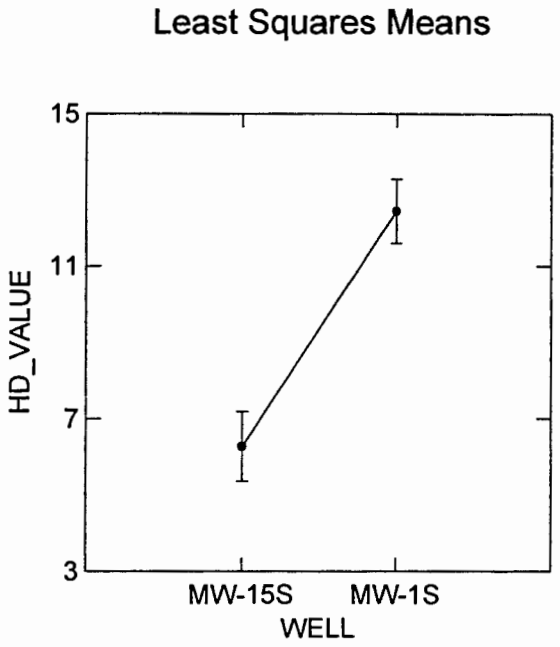
		HD_VALUE
CONSTANT		9.354
WELL$	MW-15S	-3.085

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	745.980	1	745.980	24.832	0.000
Error	2313.139	77	30.041		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-15S	6.269	0.913	36
WELL$	=MW-1S	12.440	0.836	43



*** WARNING ***
Case 102 is an outlier (Studentized Residual = 4.494)

Durbin-Watson D Statistic 0.838
First Order Autocorrelation 0.572
COL/
ROW WELL$
1 MW-15S
2 MW-1S
Using least squares means.
Post Hoc test of HD_VALUE

Using model MSE of 30.041 with 77 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	6.170	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-15S, MW-1S

Dep Var: HD_LN_VALU N: 79 Multiple R: 0.560 Squared multiple R: 0.313

Estimates of effects $B = (X'X)^{-1} X'Y$

		HD_LN_VALU
CONSTANT		2.022
WELL$	MW-15S	-0.432

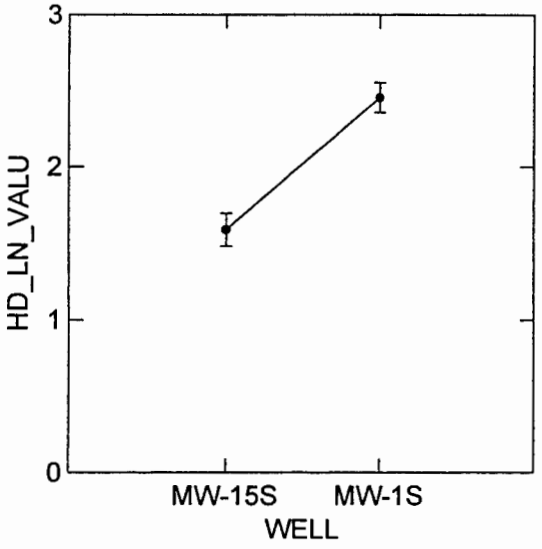
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	14.637	1	14.637	35.129	0.000
Error	32.083	77	0.417		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-15S	1.590	0.108	36
WELL$	=MW-1S	2.455	0.098	43

Least Squares Means



*** WARNING ***
Case 86 is an outlier (Studentized Residual = -3.906)

Durbin-Watson D Statistic 0.681
First Order Autocorrelation 0.577
COL/
ROW WELL$
1 MW-15S
2 MW-1S
Using least squares means.
Post Hoc test of HD_LN_VALU

Using model MSE of 0.417 with 77 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	0.864	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

655 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jul99\1-16.SYD,
created Wed Oct 06, 1999 at 13:21:56, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-16, MW-1S

Dep Var: HD_VALUE N: 73 Multiple R: 0.728 Squared multiple R: 0.530

Estimates of effects $B = (X'X)^{-1} X'Y$

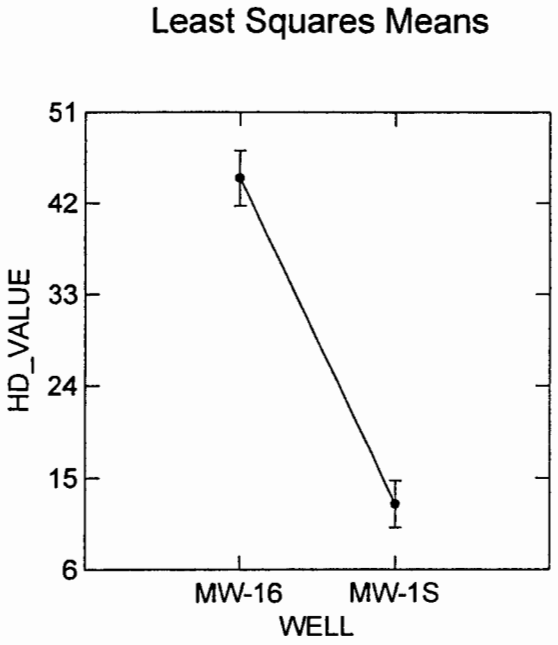
		HD_VALUE
CONSTANT		28.453
WELL$	MW-16	16.014

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	18126.040	1	18126.040	79.970	0.000
Error	16092.989	71	226.662		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-16	44.467	2.749	30
WELL$	=MW-1S	12.440	2.296	43



*** WARNING ***
Case 66 is an outlier (Studentized Residual = 3.364)
Case 439 is an outlier (Studentized Residual = 5.167)

Durbin-Watson D Statistic 1.373
First Order Autocorrelation 0.286
COL/
ROW WELL$
1 MW-16
2 MW-1S
Using least squares means.
Post Hoc test of HD_VALUE

Using model MSE of 226.662 with 71 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-32.027	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-16, MW-1S

Dep Var: HD_LN_VALU N: 73 Multiple R: 0.781 Squared multiple R: 0.610

Estimates of effects $B = (X'X)^{-1} X'Y$

		HD_LN_VALU
CONSTANT		3.053
WELL$	MW-16	0.598

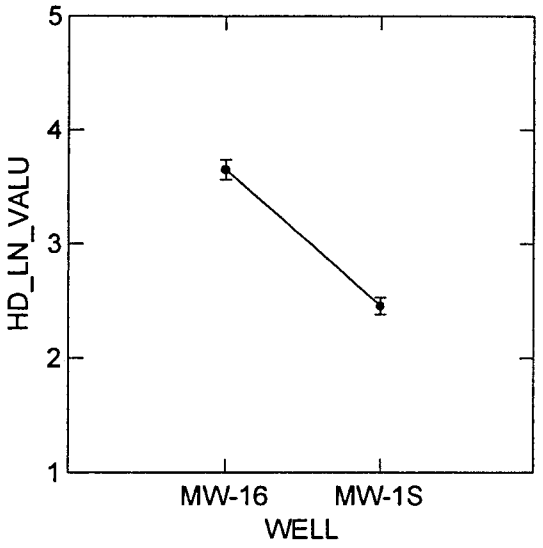
Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	25.316	1	25.316	110.866	0.000
Error	16.213	71	0.228		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-16	3.651	0.087	30
WELL$	=MW-1S	2.455	0.073	43

Least Squares Means



Durbin-Watson D Statistic 1.243
First Order Autocorrelation 0.349
COL/
ROW WELL$
1 MW-16
2 MW-1S
Using least squares means.
Post Hoc test of HD_LN_VALU

Using model MSE of 0.228 with 71 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-1.197	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

772 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jul99\1-3.SYD,
created Wed Oct 06, 1999 at 13:22:00, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-3

Dep Var: HD_VALUE N: 86 Multiple R: 0.561 Squared multiple R: 0.315

Estimates of effects $B = (X'X)^{-1} X'Y$

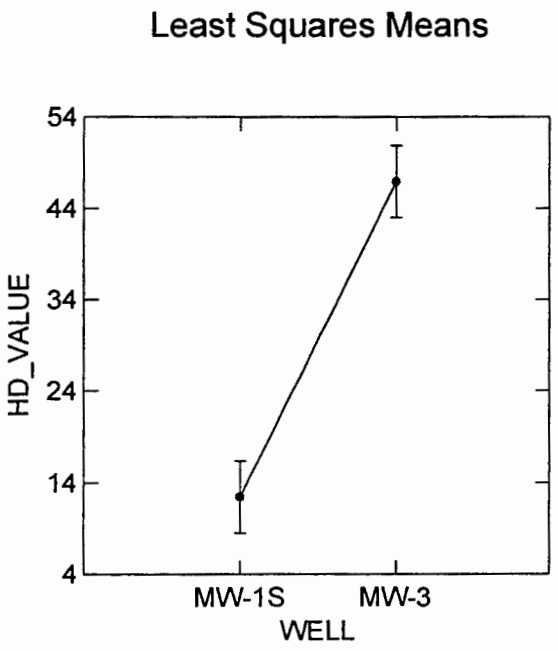
		HD_VALUE
CONSTANT		29.691
WELL$	MW-1S	-17.251

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	25593.825	1	25593.825	38.607	0.000
Error	55686.627	84	662.936		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-1S	12.440	3.926	43
WELL$	=MW-3	46.942	3.926	43



*** WARNING ***
Case 357 is an outlier (Studentized Residual = 3.472)
Case 358 is an outlier (Studentized Residual = 3.472)
Case 359 is an outlier (Studentized Residual = 3.472)

Durbin-Watson D Statistic 0.697
First Order Autocorrelation 0.651
COL/
ROW WELL$
1 MW-1S
2 MW-3
Using least squares means.
Post Hoc test of HD_VALUE

Using model MSE of 662.936 with 84 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	34.502	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-3

Dep Var: HD_LN_VALU N: 86 Multiple R: 0.665 Squared multiple R: 0.442

Estimates of effects $B = (X'X)^{-1} X'Y$

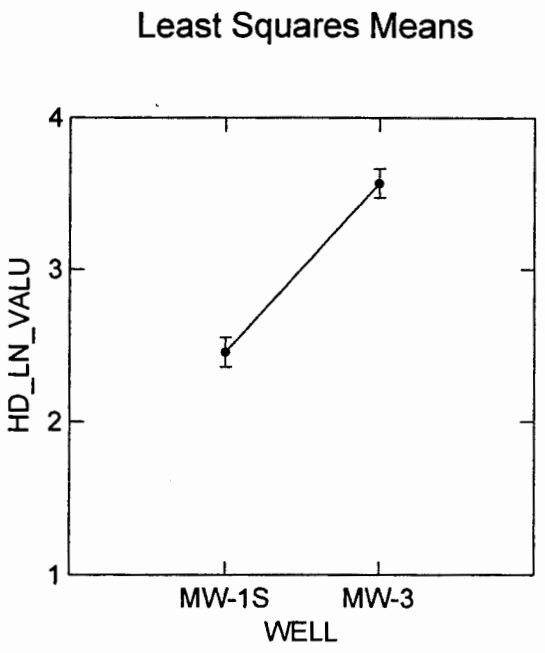
		HD_LN_VALU
CONSTANT		3.012
WELL$	MW-1S	-0.558

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	26.741	1	26.741	66.644	0.000
Error	33.705	84	0.401		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-1S	2.455	0.097	43
WELL$	=MW-3	3.570	0.097	43



```
Durbin-Watson D Statistic      1.175
First Order Autocorrelation    0.404
COL/
ROW WELL$
  1  MW-1S
  2  MW-3
Using least squares means.
Post Hoc test of HD_LN_VALU
```

```
Using model MSE of 0.401 with 84 df.
Matrix of pairwise mean differences:

                        1           2
             1          0.000
             2          1.115       0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

                        1           2
             1          1.000
             2          0.000       1.000
```

IMPORT successfully completed.

772 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jul99\1-4.SYD,
created Wed Oct 06, 1999 at 13:22:02, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-4

Dep Var: HD_VALUE N: 86 Multiple R: 0.845 Squared multiple R: 0.713

Estimates of effects $B = (X'X)^{-1} X'Y$

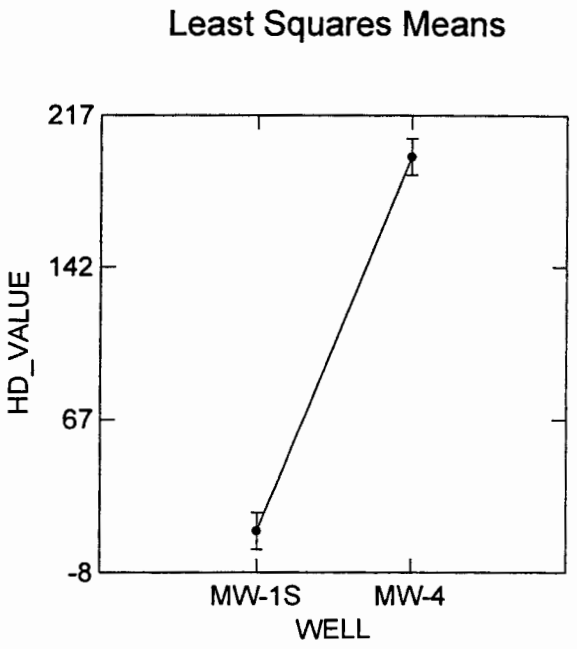
		HD_VALUE
CONSTANT		104.522
WELL$	MW-1S	-92.083

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	729210.986	1	729210.986	209.030	0.000
Error	293037.802	84	3488.545		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-1S	12.440	9.007	43
WELL$	=MW-4	196.605	9.007	43



*** WARNING ***
Case 358 is an outlier (Studentized Residual = 3.532)

Durbin-Watson D Statistic 1.073
First Order Autocorrelation 0.458
COL/
ROW WELL$
1 MW-1S
2 MW-4
Using least squares means.
Post Hoc test of HD_VALUE

Using model MSE of 3488.545 with 84 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	184.165	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-4

Dep Var: HD_LN_VALU N: 86 Multiple R: 0.930 Squared multiple R: 0.865

Estimates of effects $B = (X'X)^{-1} X'Y$

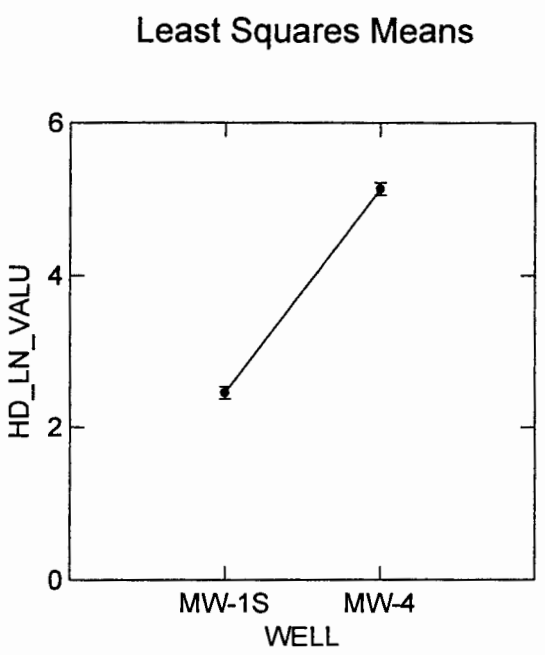
		HD_LN_VALU
CONSTANT		3.796
WELL$	MW-1S	-1.341

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	154.687	1	154.687	539.224	0.000
Error	24.097	84	0.287		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-1S	2.455	0.082	43
WELL$	=MW-4	5.137	0.082	43




```
-------------------------------------------------------------------------------

*** WARNING ***
Case          336 is an outlier        (Studentized Residual =       -3.921)
Case          712 is an outlier        (Studentized Residual =       -3.921)

Durbin-Watson D Statistic     1.547
First Order Autocorrelation   0.215
COL/
ROW WELL$
  1  MW-1S
  2  MW-4
Using least squares means.
Post Hoc test of HD_LN_VALU
-------------------------------------------------------------------------------

Using model MSE of 0.287 with 84 df.
Matrix of pairwise mean differences:

                    1           2
             1      0.000
             2      2.682       0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

                    1           2
             1      1.000
             2      0.000       1.000
-------------------------------------------------------------------------------
```

IMPORT successfully completed.

736 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jul99\1-6B.SYD,
created Wed Oct 06, 1999 at 13:22:06, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-6B

Dep Var: HD_VALUE N: 82 Multiple R: 0.161 Squared multiple R: 0.026

Estimates of effects $B = (X'X)^{-1} X'Y$

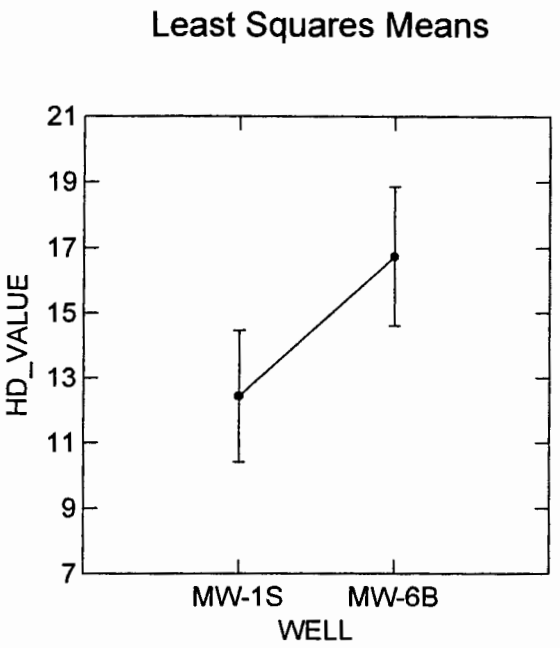
		HD_VALUE
CONSTANT		14.584
WELL$	MW-1S	-2.144

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	376.153	1	376.153	2.133	0.148
Error	14109.902	80	176.374		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-1S	12.440	2.025	43
WELL$	=MW-6B	16.728	2.127	39



*** WARNING ***
Case 334 is an outlier (Studentized Residual = 3.435)
Case 335 is an outlier (Studentized Residual = 3.624)

Durbin-Watson D Statistic 0.544
First Order Autocorrelation 0.724
COL/
ROW WELL$
1 MW-1S
2 MW-6B
Using least squares means.
Post Hoc test of HD_VALUE

Using model MSE of 176.374 with 80 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	4.289	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.148	1.000

Data for the following results were selected according to:

(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-6B

Dep Var: HD_LN_VALU N: 82 Multiple R: 0.118 Squared multiple R: 0.014

Estimates of effects $B = (X'X)^{-1} X'Y$

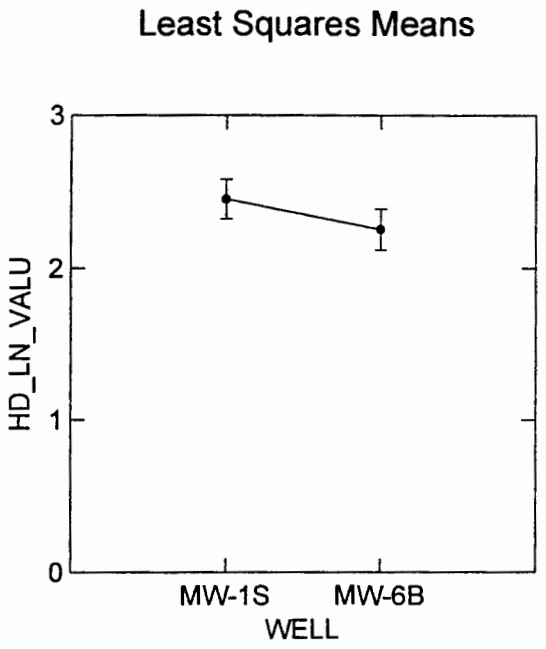
		HD_LN_VALU
CONSTANT		2.355
WELL$	MW-1S	0.100

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	0.811	1	0.811	1.137	0.289
Error	57.056	80	0.713		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-1S	2.455	0.129	43
WELL$	=MW-6B	2.255	0.135	39



Durbin-Watson D Statistic 0.815
First Order Autocorrelation 0.588
COL/
ROW WELL$
1 MW-1S
2 MW-6B
Using least squares means.
Post Hoc test of HD_LN_VALU

Using model MSE of 0.713 with 80 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	-0.199	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.289	1.000

IMPORT successfully completed.

772 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jul99\1-7.SYD,
created Wed Oct 06, 1999 at 13:22:08, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-7

Dep Var: HD_VALUE N: 86 Multiple R: 0.705 Squared multiple R: 0.497

Estimates of effects $B = (X'X)^{-1} X'Y$

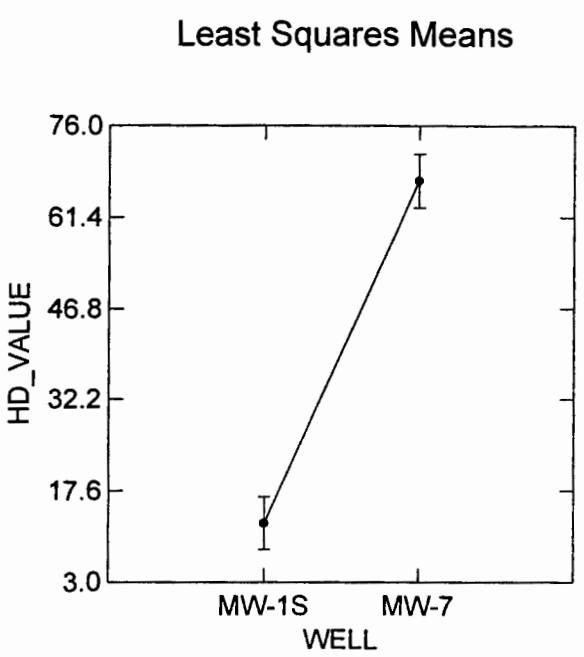
		HD_VALUE
CONSTANT		39.857
WELL$	MW-1S	-27.417

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	64647.586	1	64647.586	82.927	0.000
Error	65484.325	84	779.575		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-1S	12.440	4.258	43
WELL$	=MW-7	67.274	4.258	43



*** WARNING ***
Case 448 is an outlier (Studentized Residual = 4.050)
Case 730 is an outlier (Studentized Residual = 3.590)

Durbin-Watson D Statistic 1.388
First Order Autocorrelation 0.306
COL/
ROW WELL$
1 MW-1S
2 MW-7
Using least squares means.
Post Hoc test of HD_VALUE

Using model MSE of 779.575 with 84 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	54.835	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-7

Dep Var: HD_LN_VALU N: 86 Multiple R: 0.768 Squared multiple R: 0.590

Estimates of effects $B = (X'X)^{-1} X'Y$

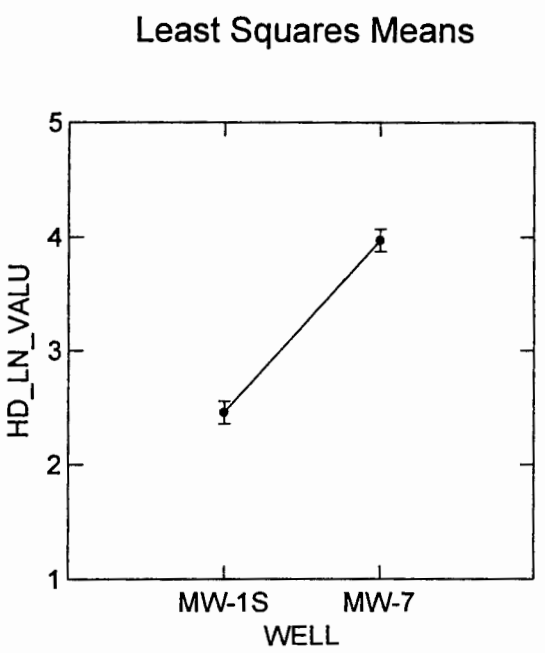
		HD_LN_VALU
CONSTANT		3.214
WELL$	MW-1S	-0.759

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	49.574	1	49.574	120.845	0.000
Error	34.459	84	0.410		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-1S	2.455	0.098	43
WELL$	=MW-7	3.973	0.098	43



*** WARNING ***
Case 336 is an outlier (Studentized Residual = -6.546)

Durbin-Watson D Statistic 1.722
First Order Autocorrelation 0.131
COL/
ROW WELL$
1 MW-1S
2 MW-7
Using least squares means.
Post Hoc test of HD_LN_VALU

Using model MSE of 0.410 with 84 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	1.518	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

IMPORT successfully completed.

772 cases and 6 variables processed and saved.

SYSTAT Rectangular file O:\2279-111\Jul99\1-9.SYD,
created Wed Oct 06, 1999 at 13:22:12, contains variables:

WELL$ PARAM_ID$ VALUE LN_VALUE HD_VALUE HD_LN_VALU

Data for the following results were selected according to:
(PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
MW-1S, MW-9

Dep Var: HD_VALUE N: 86 Multiple R: 0.615 Squared multiple R: 0.378

Estimates of effects $B = (X'X)^{-1} X'Y$

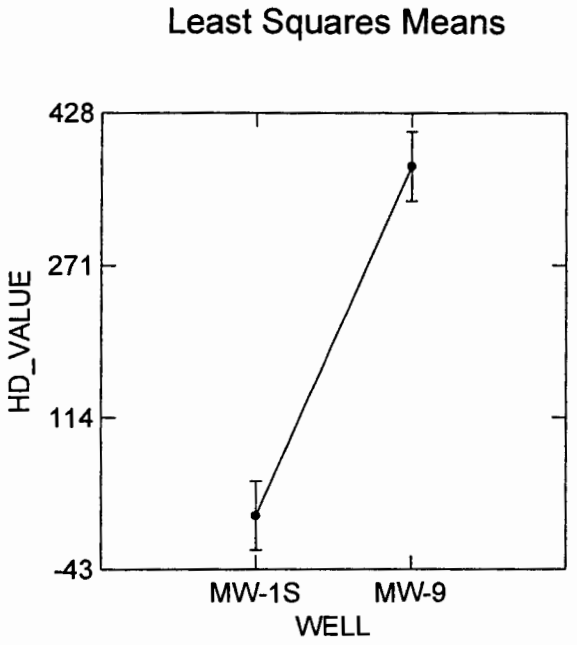
		HD_VALUE
CONSTANT		192.697
WELL$	MW-1S	-180.257

Analysis of Variance

Source	Sum-of-Squares	df	Mean-Square	F-ratio	P
WELL$	2794361.679	1	2794361.679	50.964	0.000
Error	4605747.430	84	54830.327		

Least squares means.

		LS Mean	SE	N
WELL$	=MW-1S	12.440	35.709	43
WELL$	=MW-9	372.953	35.709	43



*** WARNING ***
Case 694 is an outlier (Studentized Residual = 4.427)
Case 712 is an outlier (Studentized Residual = 3.858)

Durbin-Watson D Statistic 1.259
First Order Autocorrelation 0.350
COL/
ROW WELL$
1 MW-1S
2 MW-9
Using least squares means.
Post Hoc test of HD_VALUE

Using model MSE of 54830.327 with 84 df.
Matrix of pairwise mean differences:

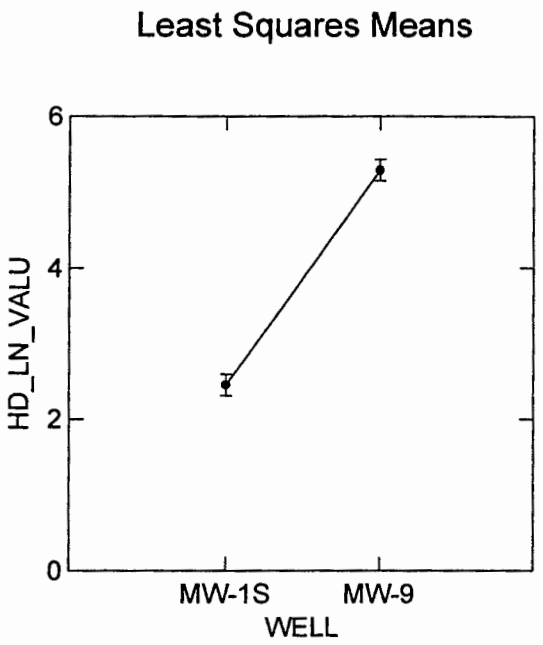
	1	2
1	0.000	
2	360.514	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000

Data for the following results were selected according to:

```
      (PARAM_ID$= "TCE")

Effects coding used for categorical variables in model.

Categorical values encountered during processing are:
WELL$ (2 levels)
   MW-1S, MW-9

Dep Var: HD_LN_VALU   N: 86   Multiple R: 0.840   Squared multiple R: 0.705

                                  -1
Estimates of effects  B = (X'X)  X'Y

                            HD_LN_VALU

   CONSTANT                    3.873

   WELL$       MW-1S          -1.418

                          Analysis of Variance

Source              Sum-of-Squares   df  Mean-Square     F-ratio       P

WELL$                      172.920    1      172.920     201.219       0.000

Error                       72.186   84        0.859

------------------------------------------------------------------------------

Least squares means.
                                 LS Mean          SE      N
  WELL$       =MW-1S               2.455       0.141     43
  WELL$       =MW-9                5.291       0.141     43
------------------------------------------------------------------------------
```



Durbin-Watson D Statistic 1.235
First Order Autocorrelation 0.365
COL/
ROW WELL$
1 MW-1S
2 MW-9
Using least squares means.
Post Hoc test of HD_LN_VALU

Using model MSE of 0.859 with 84 df.
Matrix of pairwise mean differences:

	1	2
1	0.000	
2	2.836	0.000

Tukey HSD Multiple Comparisons.
Matrix of pairwise comparison probabilities:

	1	2
1	1.000	
2	0.000	1.000
